

Nikon FG-20

REPAIR MANUAL

修 理 指 針



NIPPON KOGAKU K.K.

Tokyo, Japan

SPECIFICATIONS & MECHANISM

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SPECIFICATIONS

Type of camera: 35mm single-lens reflex

Usable film: 35mm film

Picture format: 24mm X 36mm


Standard lenses: AI-S Nikkor 50mm F1.2, 50mm F1.4, 50mm F1.8,
Series E 50mm F1.8

Lens for adjustments: AI 50mm F1.8 (20FL51)

Lens mount: Nikon bayonet mount

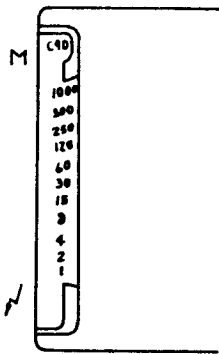
Maximum aperture index (AI): Provided


Shutter: Electronically-controlled vertical travel, metal focal plane shutter
SEIKO MFC-E271

Shutter speeds: Stepless speeds from 1 to 1/1000 sec. in automatic (A, ) exposure mode; 11 speeds from 1 to 1/1000 sec. in manual mode; mechanically controlled M90 (1/90 sec.) and B (bulb) settings available

Self-timer: Approx. 11 sec. delayed exposure; mechanical type; cancellable after setting

Viewfinder: Fixed eyelevel pentaprism type; 0.86X magnification with 50mm lens set at infinity; 92% frame coverage; -1 ± 0.5 dpt



Viewfinder display: Shutter speed scale, meter needle, manual mode indication LED (red M), ready-light LED (red )

Focusing screen: Nikon Type K clear-matte screen

Reflex mirror: Automatic instant-return type

Film-advance lever: Wound in single stroke or series of strokes with 144° winding angle, hinged type lever

Automatic film-advance: Possible with optional Motor Drive MD-14 or MD-E

Exposure meter: TTL center-weighted full-aperture measurement system
($\phi 12$ approx. 40%) using one SPD

Audible warning: Available when shutter speed dial is set at \bullet ; "beep-beep" sound activated as soon as shutter release button is depressed halfway when shutter speed is around 1/30 sec. or lower or around 1/1000 sec. or higher

Metering range: EV1 to EV18 at ASA/ISO 100 with 50mm F1.4 lens

Film speed range: ASA/ISO 25 to 3200

Exposure compensation: $+2+0.4$ EV exposure compensation possible by depressing the exposure compensation button

Power switch: Power switch turned on when shutter release button is depressed halfway; stays on for approx. 20 sec. after finger is removed from button; is turned off when shutter speed dial is set to M90 or B

Battery check: By confirming if power switch is on by depressing shutter release button halfway

Battery voltage	Power switch
More than 2.5V	Remains on for 15 - 35 sec.
2.5 - 2.38V	Remains on momentarily
less than 2.38V	Fails to turn on

Power source: Two 1.55V silver-oxide batteries (SR44) or one 3V lithium battery (CR-1/3N) or two 1.5V alkaline-manganese batteries (LR44)

Battery consumption: Metering

Auto: Approx. 3mA

Manual: Approx. 4.5mA

Shutter releasing: Approx. 13mA

Frame counter: Additive type, self-resetting; for blank exposure before frame 1, shutter fires at 1/90 sec. on auto or at any shutter speed dial setting on manual

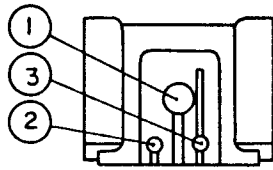
Film rewind: Via folding crank and rewind button

Sync contact: X contact only, speed of 1/90 sec. or slower

Synchronization: With electronic flash; with Nikon dedicated flash unit, flash sync automatically set to 1/90 sec. when camera is set at either automatic exposure mode or when shutter speed dial is set at 1/125 or higher in manual mode; at slower speeds on manual, shutter fires at speed set

Ready-light: Viewfinder thunder bolt mark " " lights up when Nikon dedicated speedlight unit is completely recycled, ready-light blinks when the aperture setting is incorrect (SB-E, EM mode only)

Accessory shoe:



①: Sync contact

②: Ready-light contact

③: Contact for the SB-19 and SB-E

Camera back: Pops open when film rewind knob is pulled up; memo holder provided

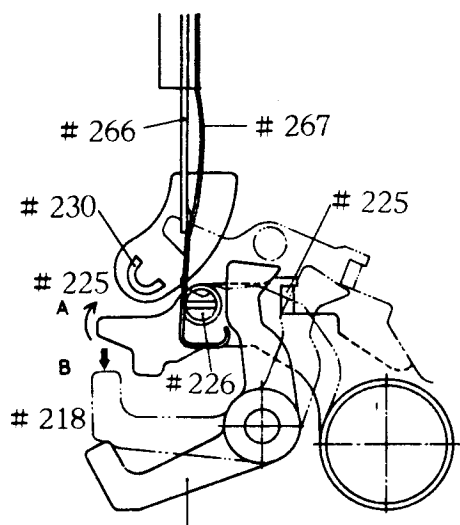
Eyepiece: Eyepiece correction lenses, rubber eyecup attachable, Magnifier DG-2 attachable by using eyepiece adapter

Dimensions: 136mm (W) X 88mm (H) X 54mm (D)

Weight: Approx. 440g (body only)

[2] MECHANISM

Mirror bound stop mechanism

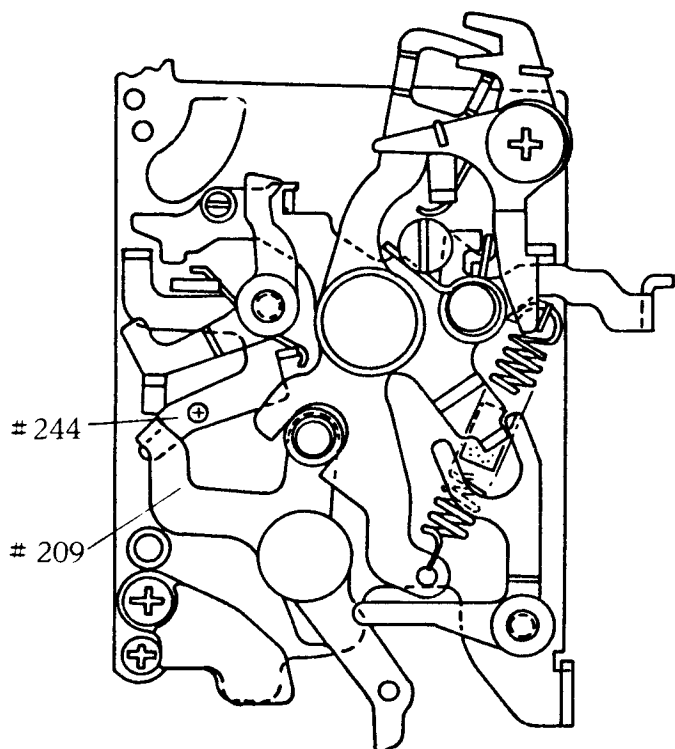


Turning Mirror-up lever #225 to Direction A executes mirror rising. At mirror rising, Mirror switch blade B #267 is unlatched from Mirror switch pin #226 and turns Bound stopper lever #218 clockwise. Thus Bound stopper lever #218 is latched with the bend of #225 as soon as the mirror rising is completed to stop mirror bound. The clearance between #218 and the bend of #225 is controlled by adjusting the bend of #225 to regulate the mirror bound.

The latch of #218 with #225 is unlatched by the closing curtain signal (second release).

The closing curtain signal is inputted into #218 from Direction B and #218 is turned counterclockwise to release the latch.

At the moment, Mirror down hook #244 is also turned counterclockwise to make #225 go down. However, the latch release of #218 with #225 is prior to that of #209 with #244 to execute the mirror down smoothly.



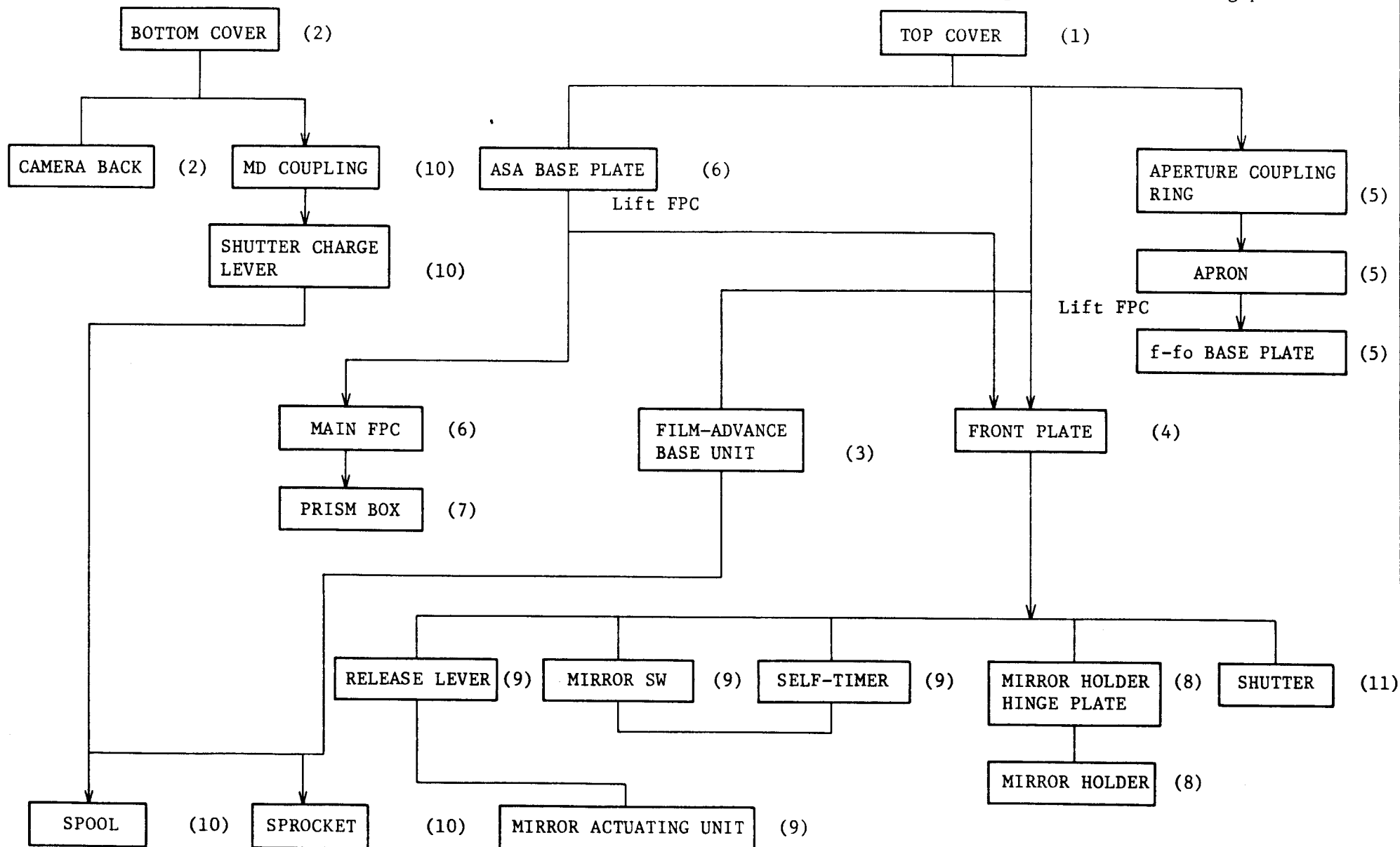
DISASSEMBLING & ASSEMBLING & ADJUSTMENTS & EXPLOSION DRAWINGS

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[1] DISASSEMBLING

1. DISASSEMBLING OUTLINE

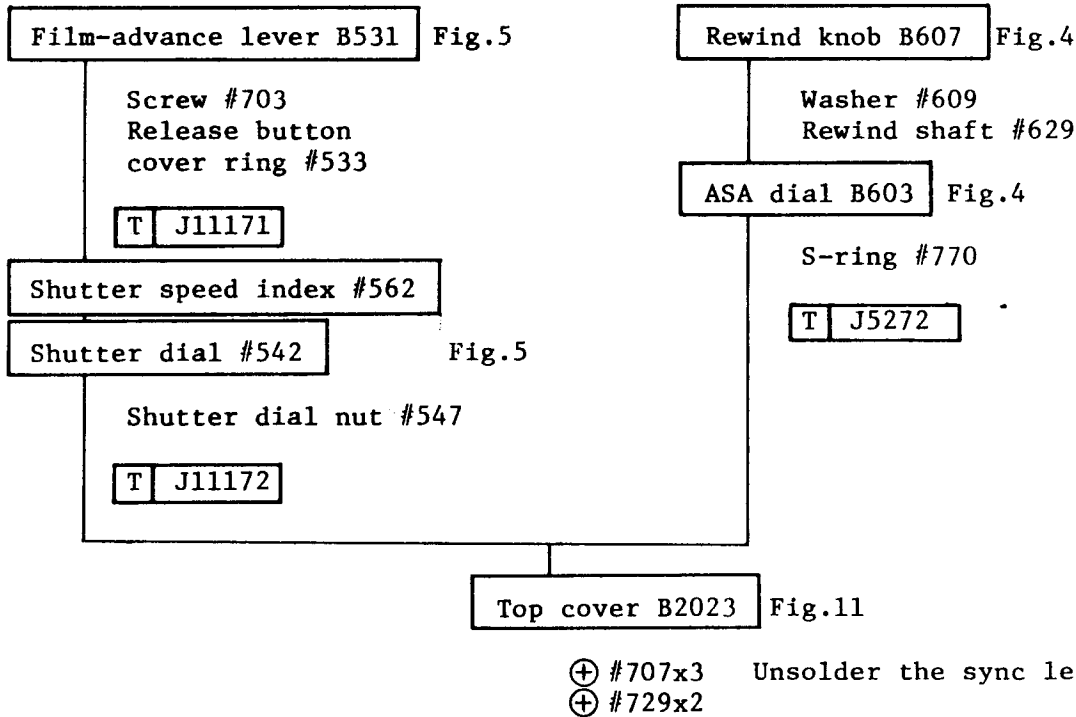
Note: 1) Numbers in parentheses refer to disassembling procedures.
2) Figure numbers refer to figures in reassembling procedures.



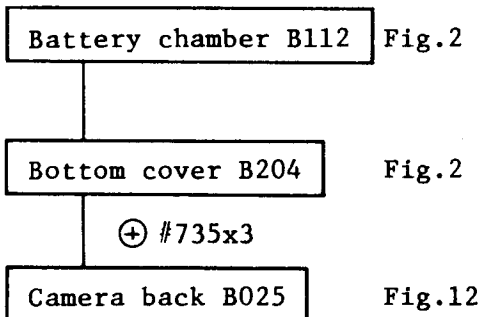
2. DISASSEMBLING PROCEDURE

- Note: 1) Disassembling should be started after batteries are removed.
- 2) Figure numbers refer to figures in reassembling procedure.
- 3) Be sure to learn how the lead wires are arranged.

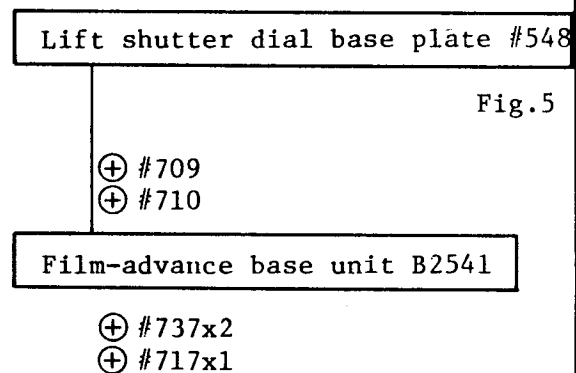
(1) Top cover



(2) Bottom cover

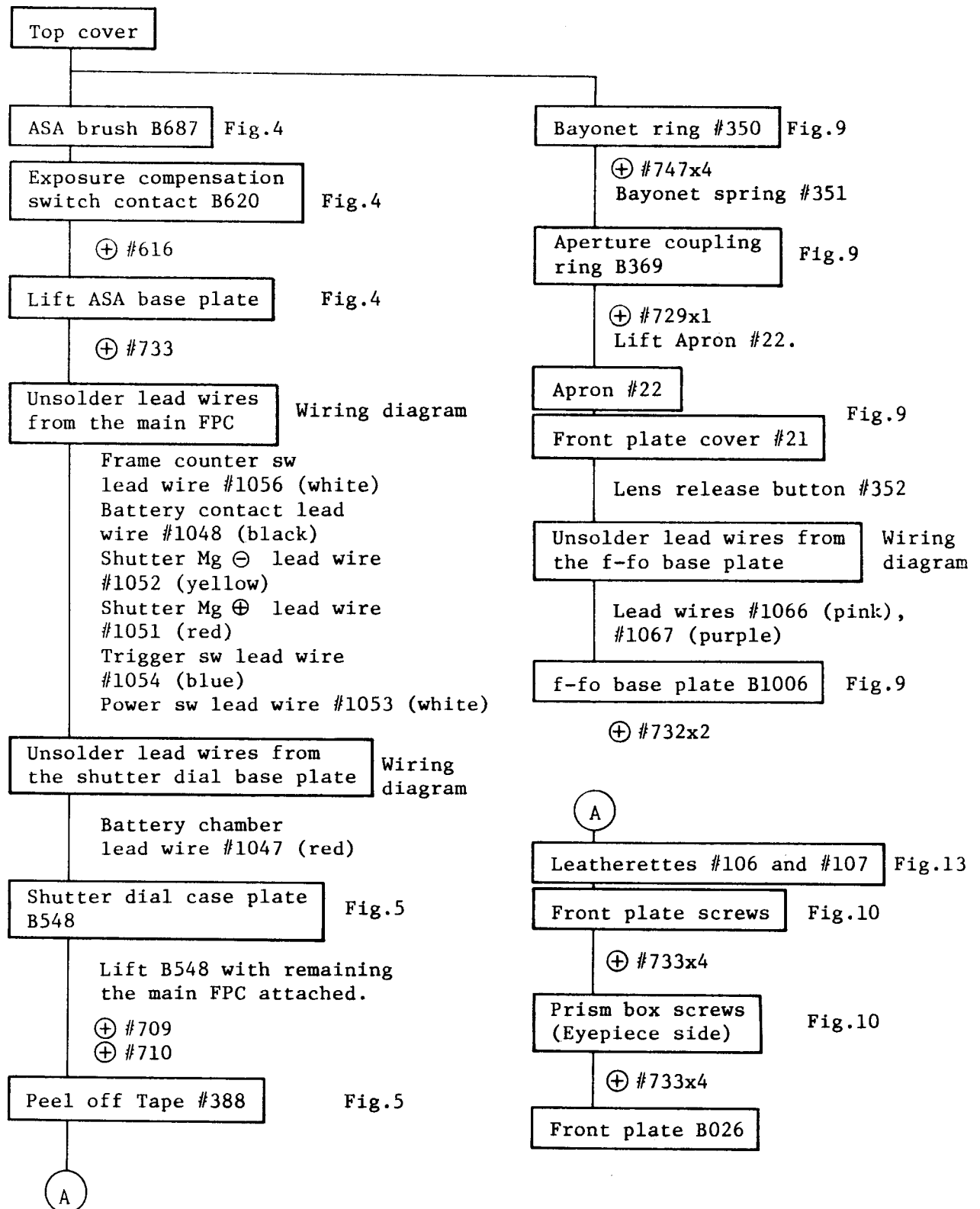


(3) Film-advance base unit

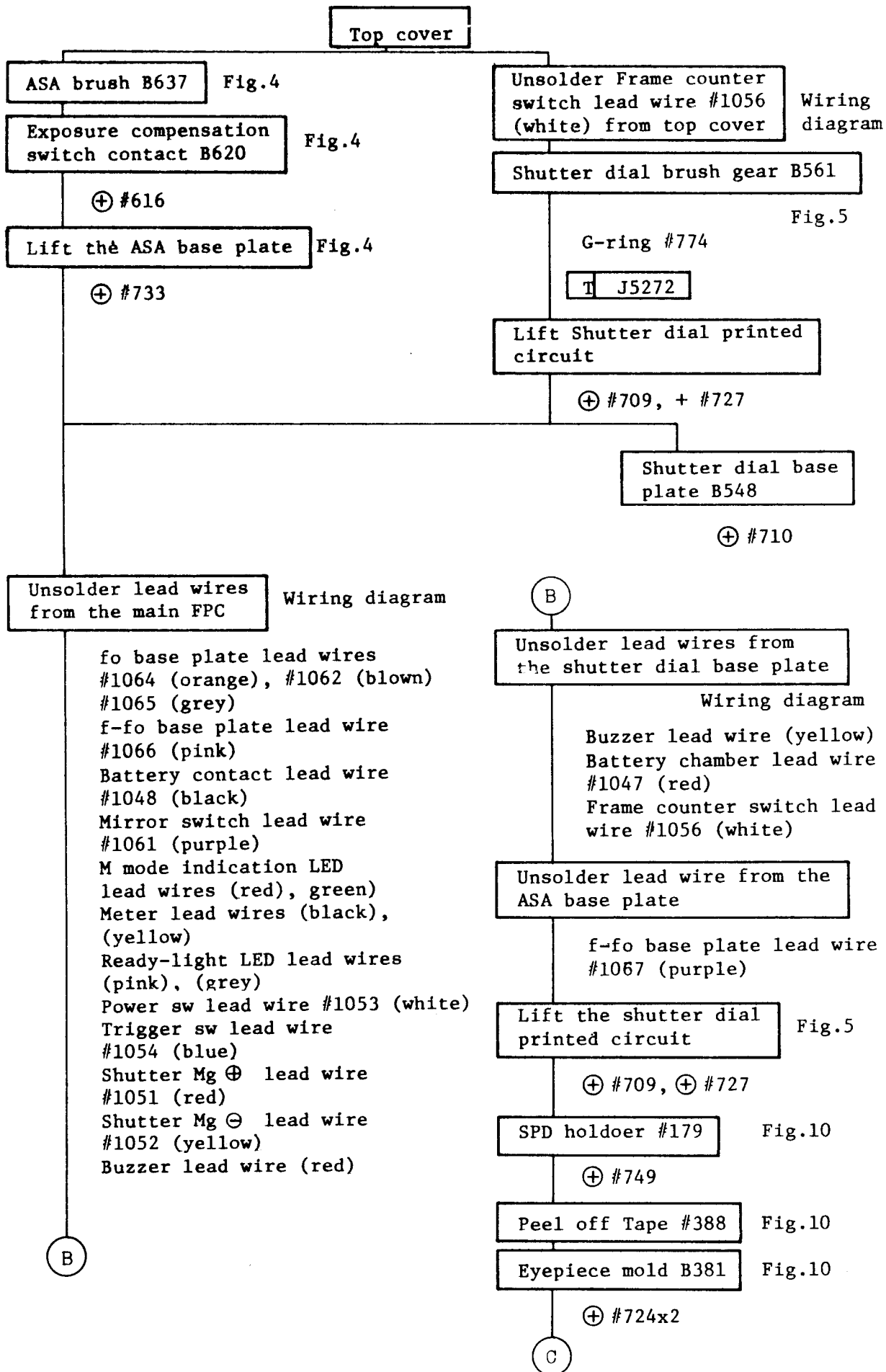


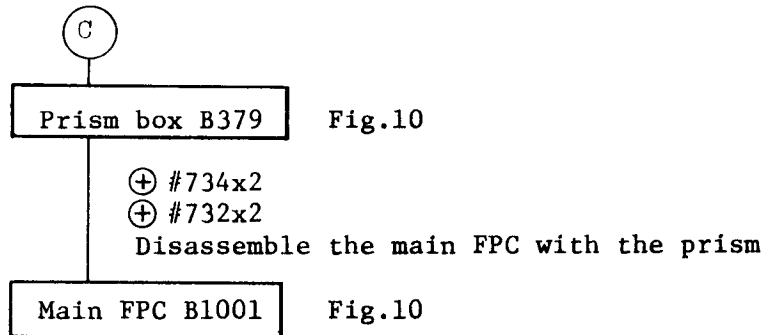
(4) Front plate

(5) Aperture coupling ring, apron



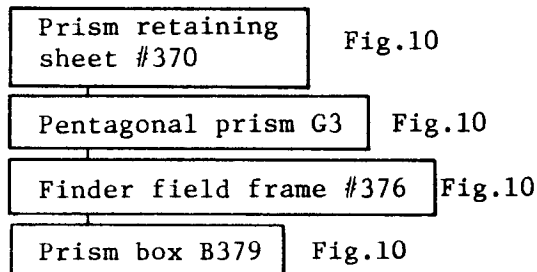
(6) Main FPC (shutter dial base plate)





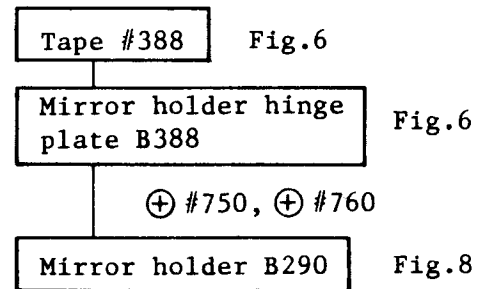
Prism retaining spring A #371
Prism retaining spring B #373

(7) Prism box



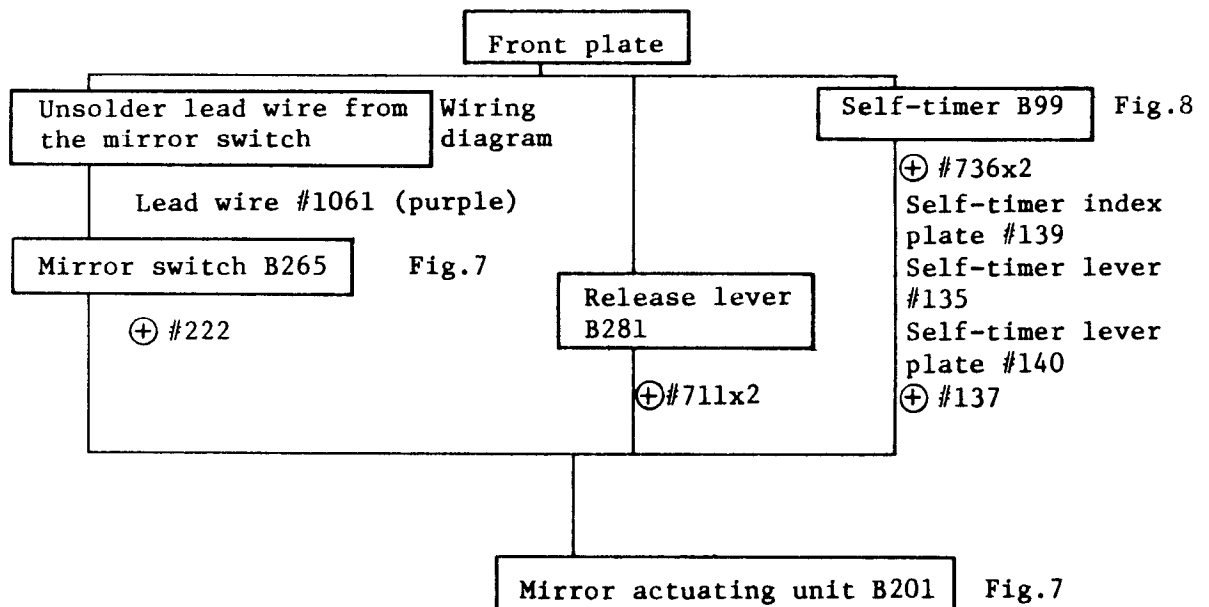
Meter is also disassembled.

(8) Mirror holder



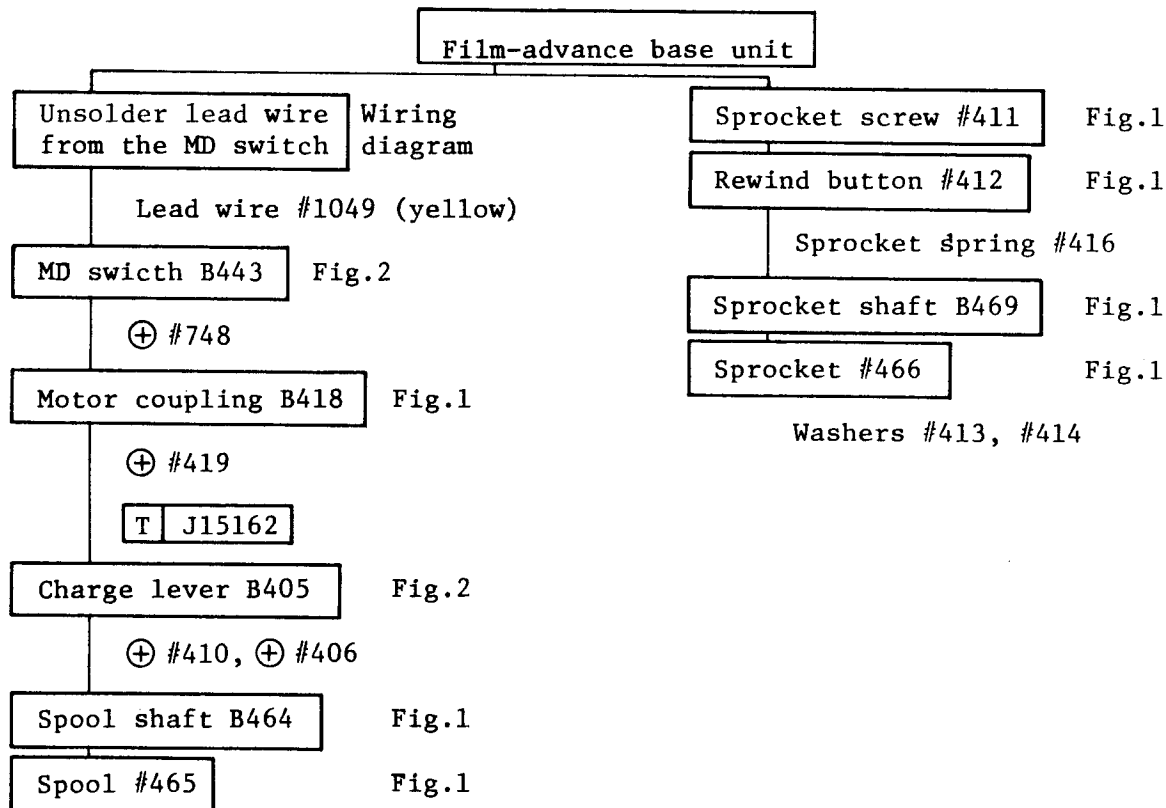
Washer #760
Mirror holder spring #296

(9) Mirror actuating unit

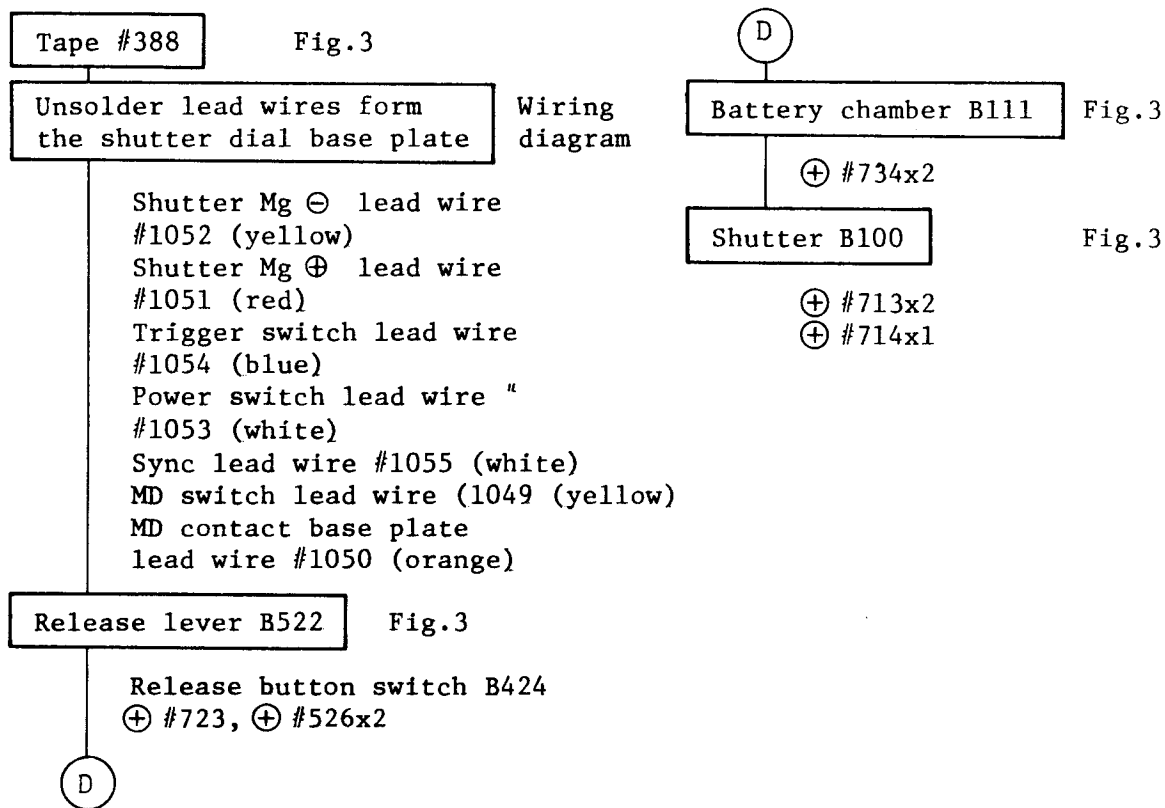


⊕ #756x2
Be careful to handle Mirror down spring #340.

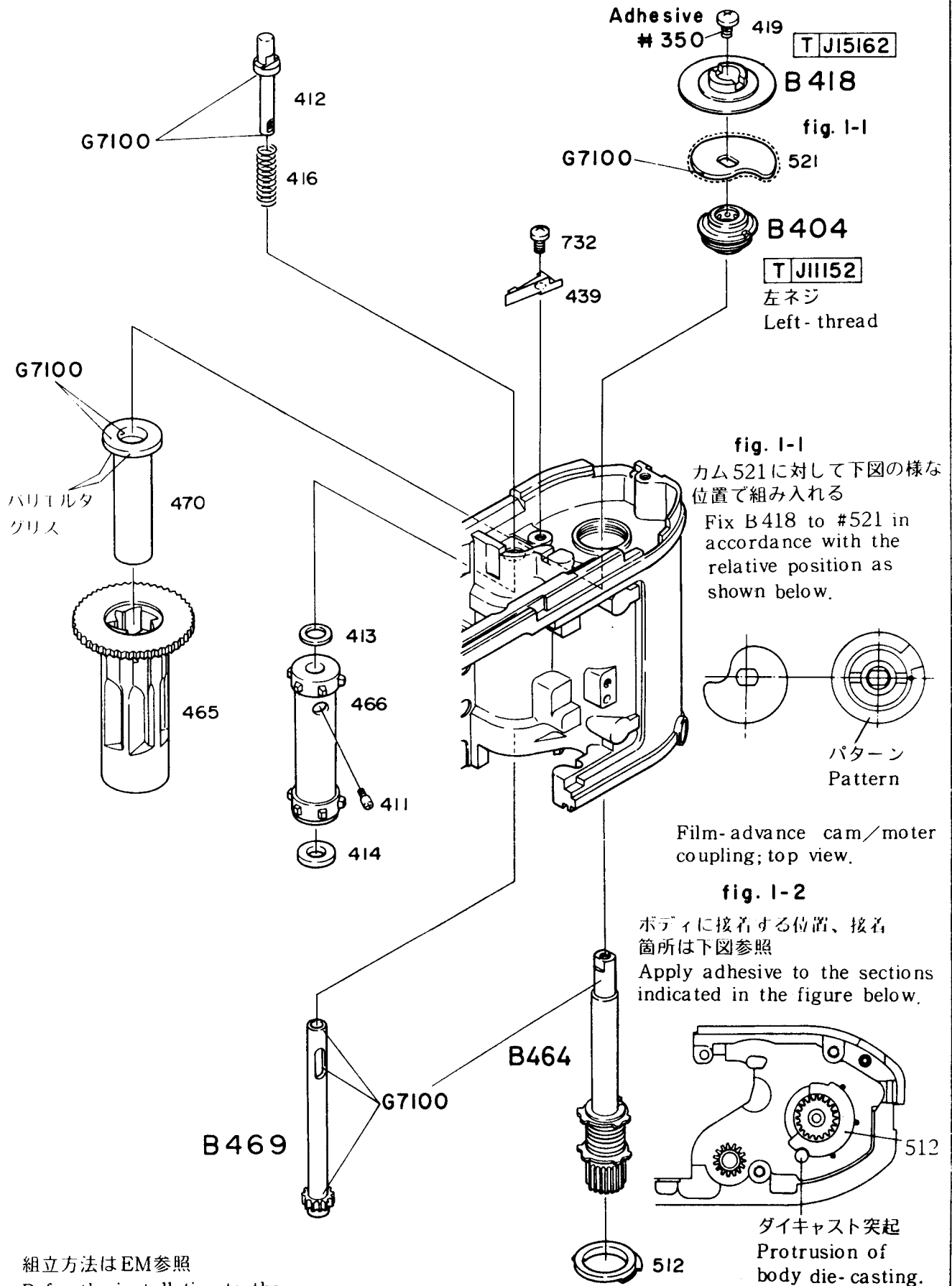
(10) Spool, sprocket



(11) Shutter



1. スプール・スプロケット SPOOL & SPOROKET



組立方法はEM参照
Refer the installation to the
pertaining section of repair
manual for the Nikon EM.

Fig. 1

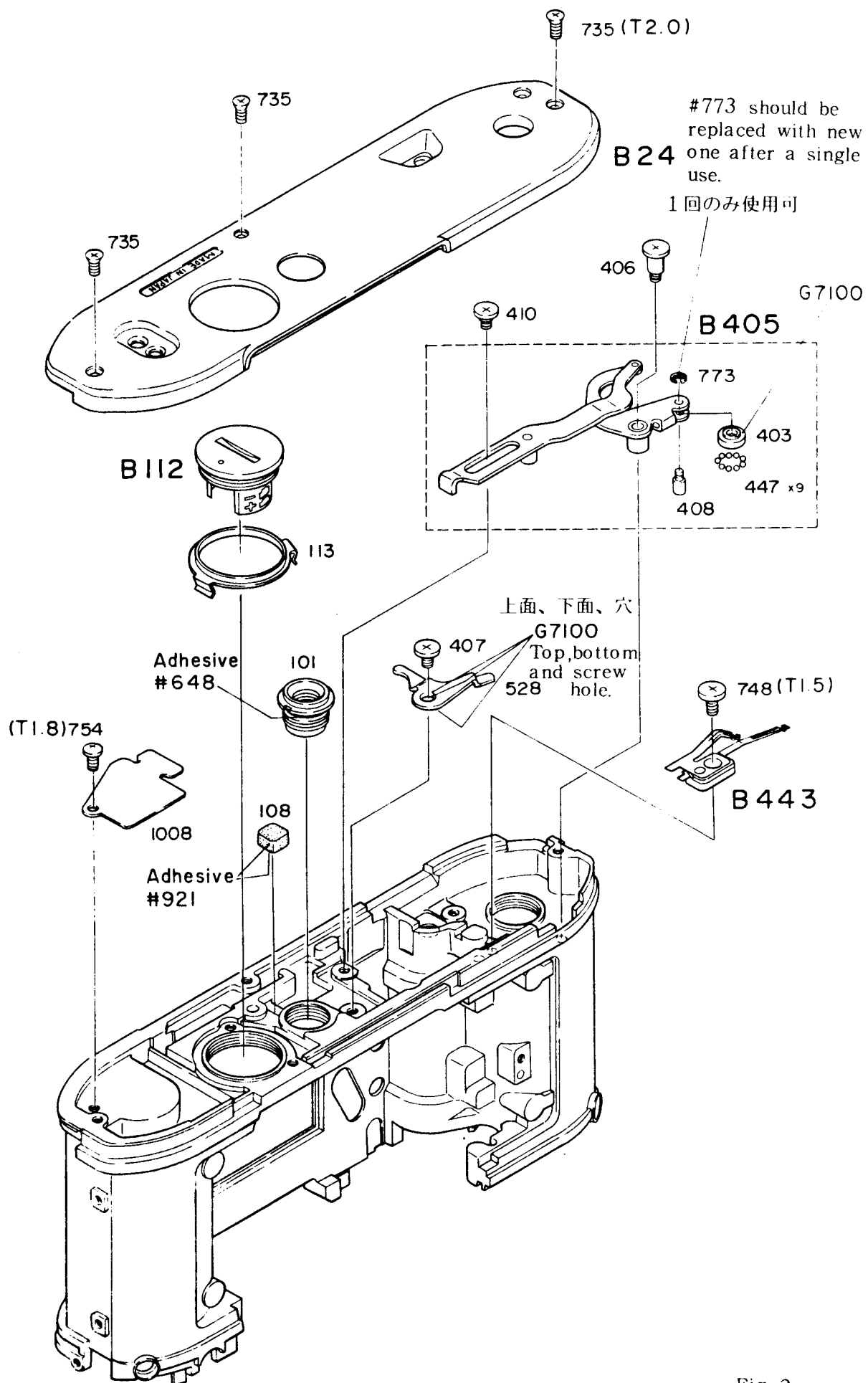


Fig. 2

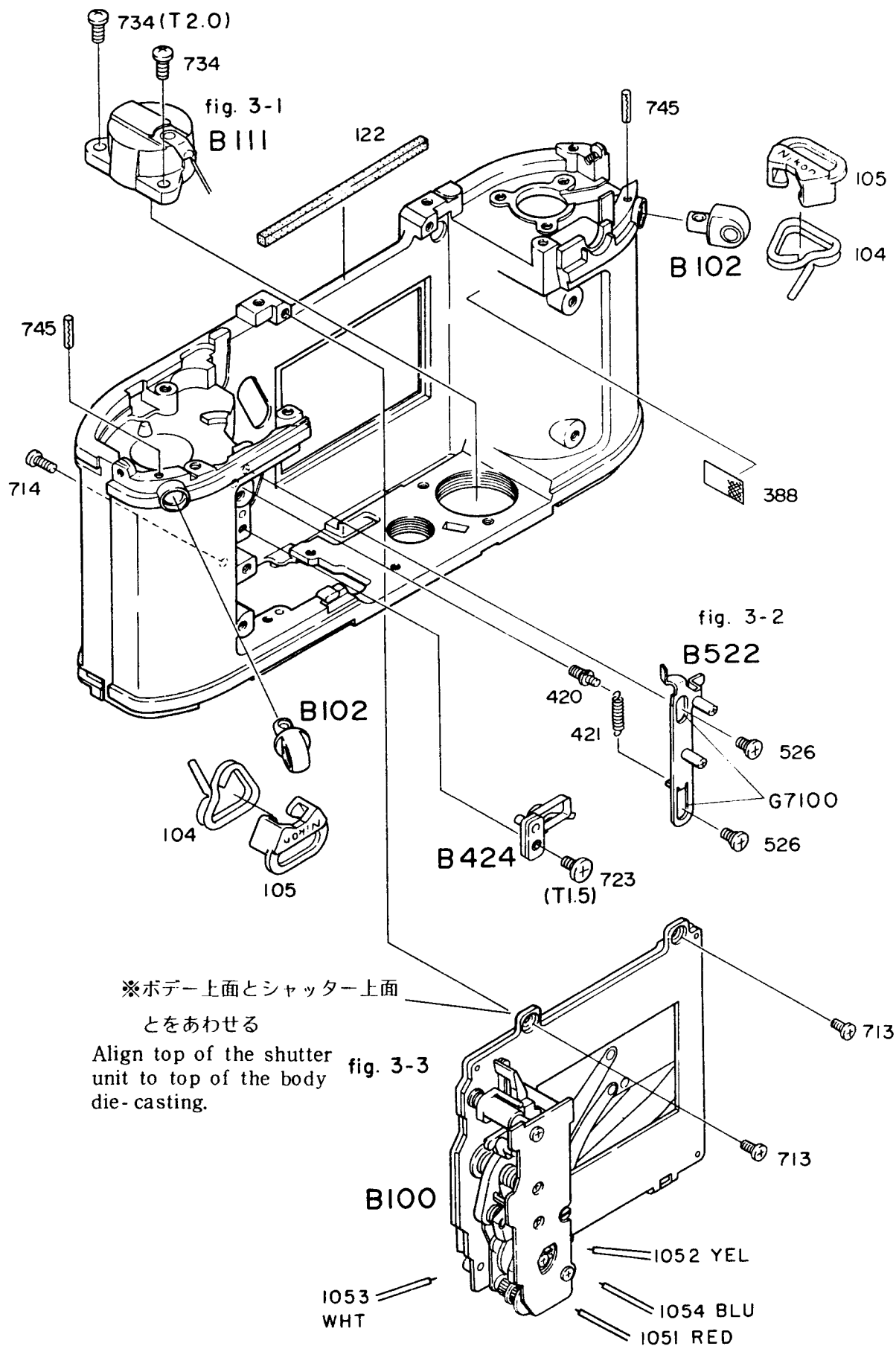


Fig. 3

Fig.3-1 Route of battery chamber lead wires

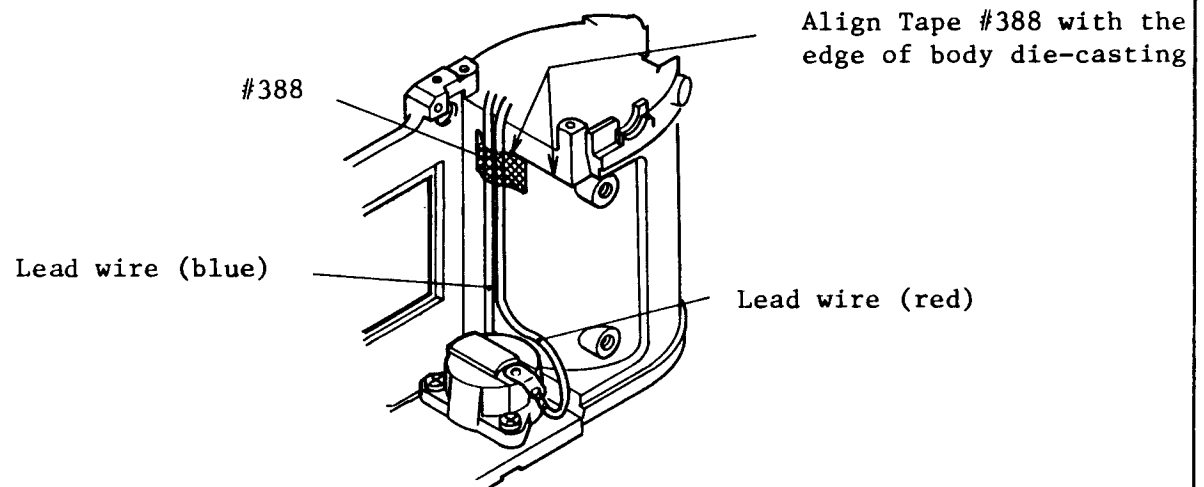


Fig.3-2 Power switch contact positioning

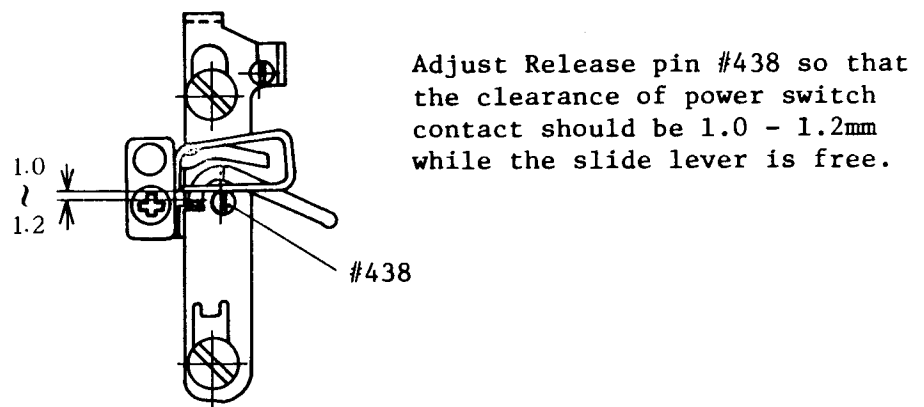
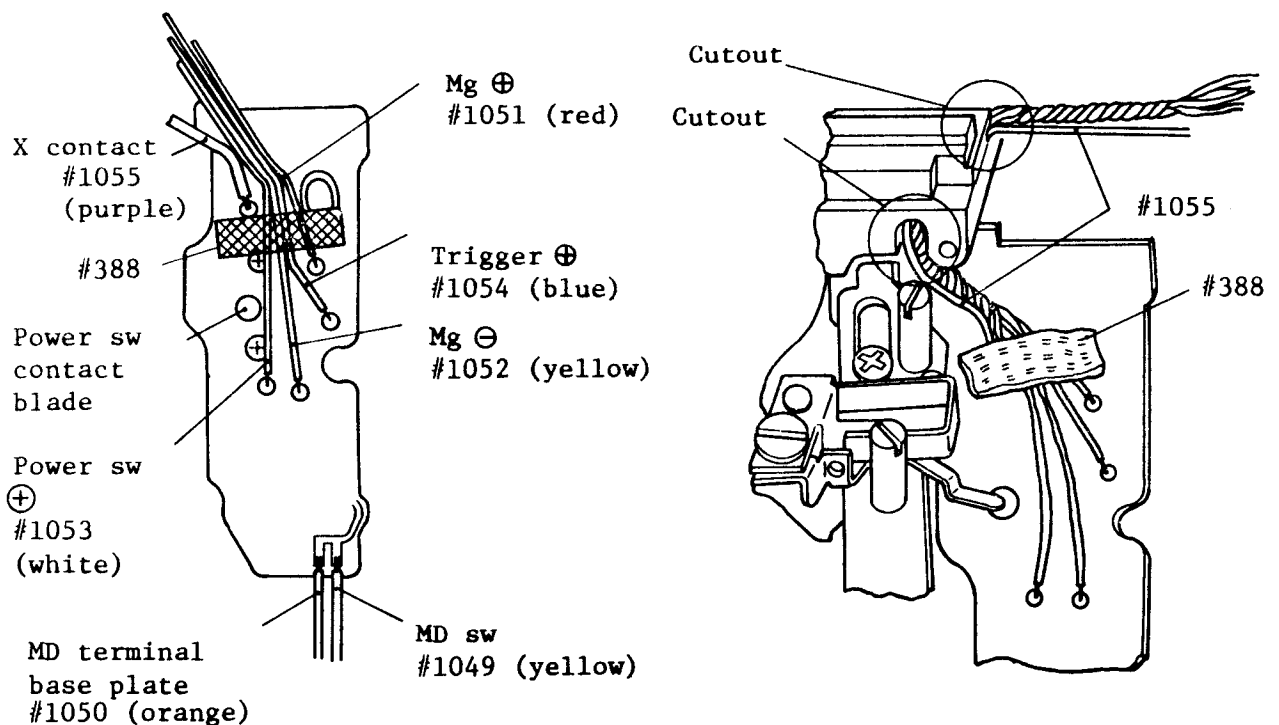


Fig.3-3 Soldering and route of shutter shutter base plate lead wires



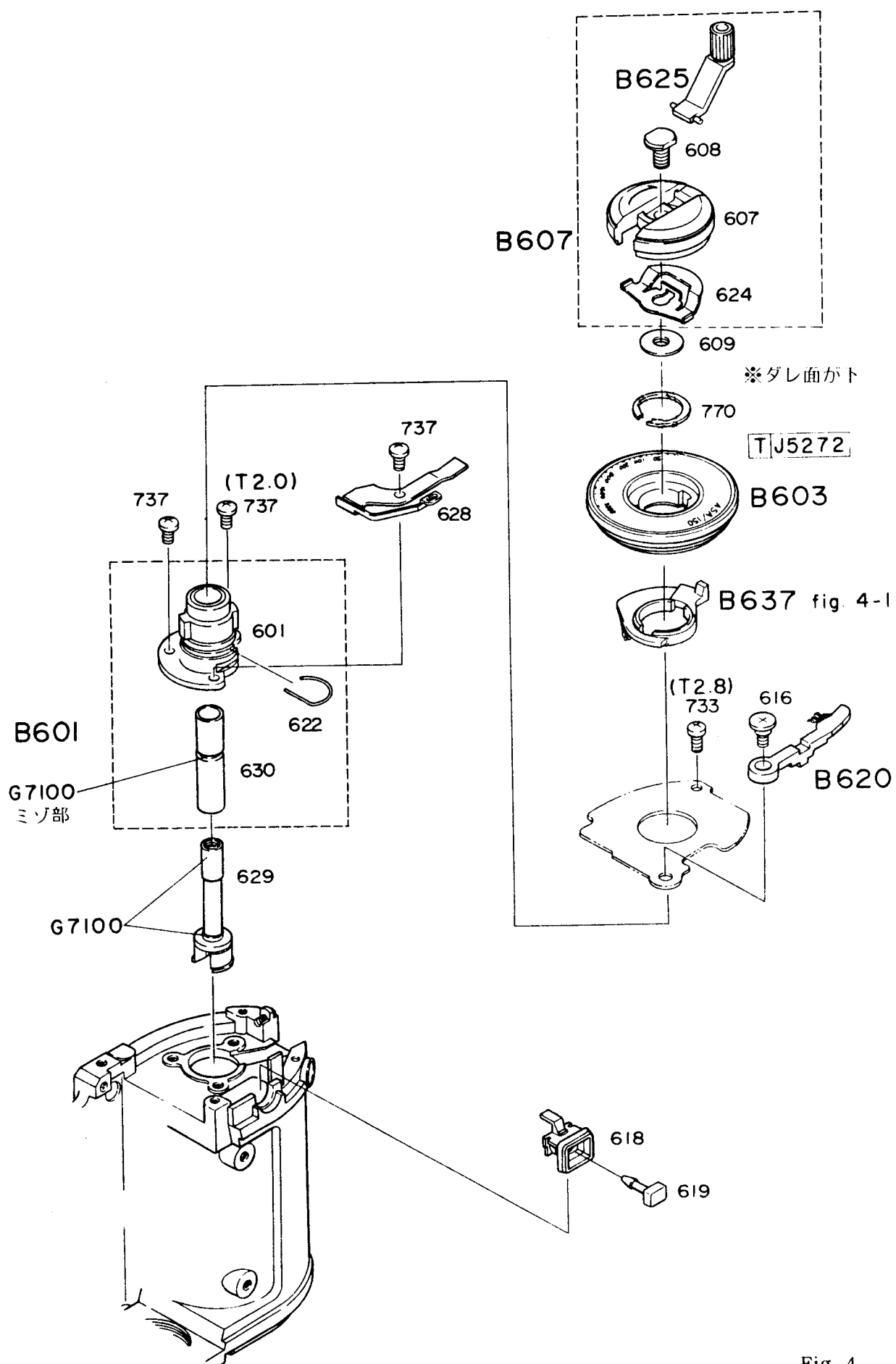
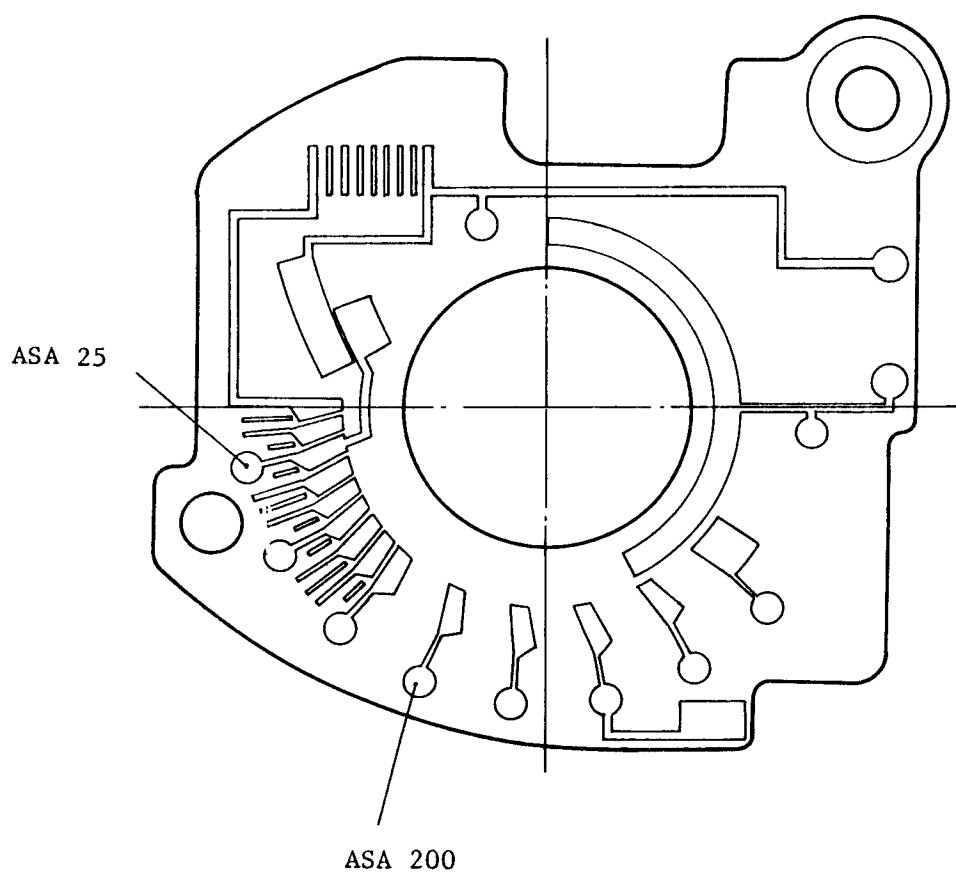


Fig. 4

Fig.4-1 ASA brush positioning

Loosen Screws #616 and #733 to slide the ASA base plate so that three tips of the ASA brushes can contact center of the pattern of ASA 200.



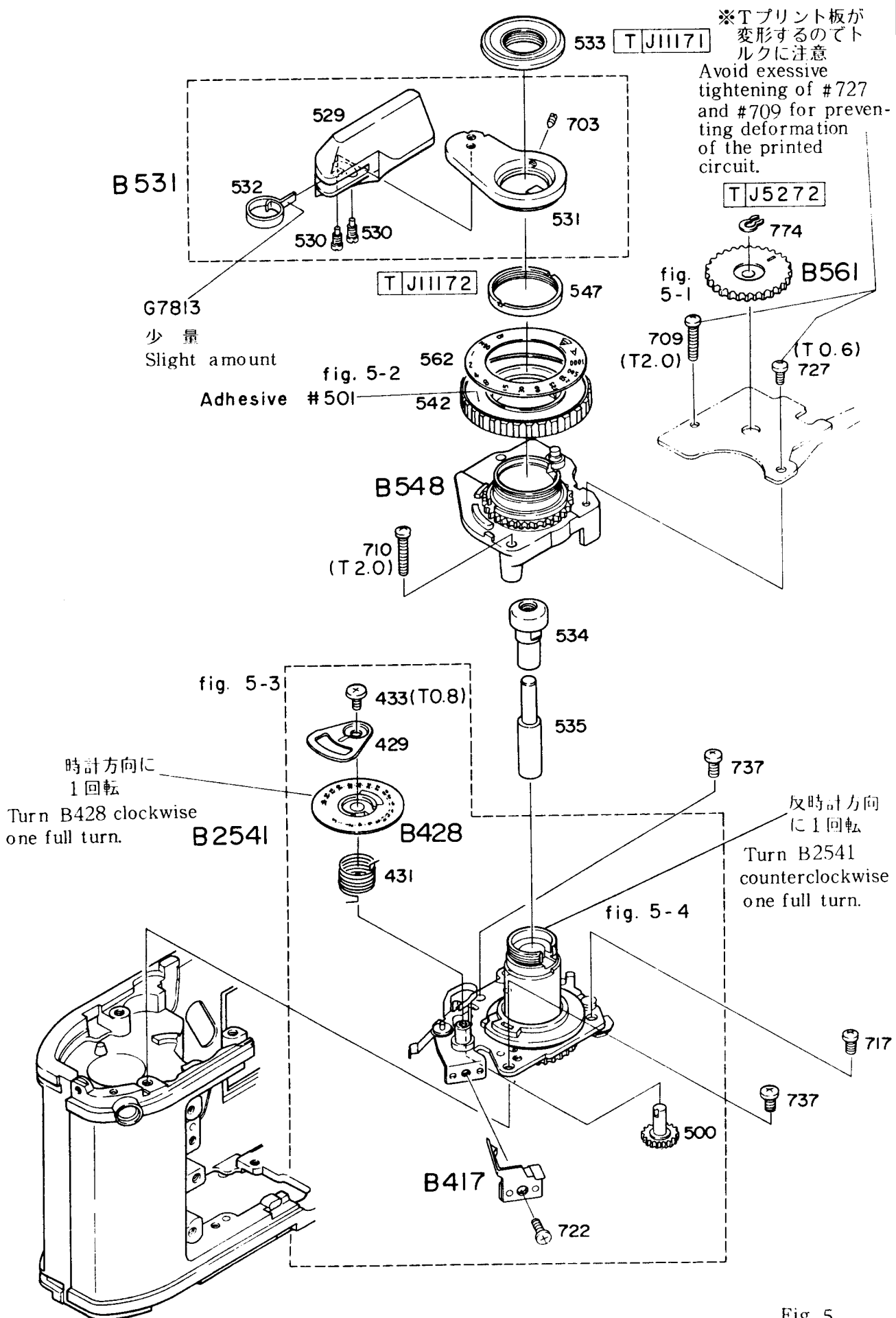


Fig. 5

B026

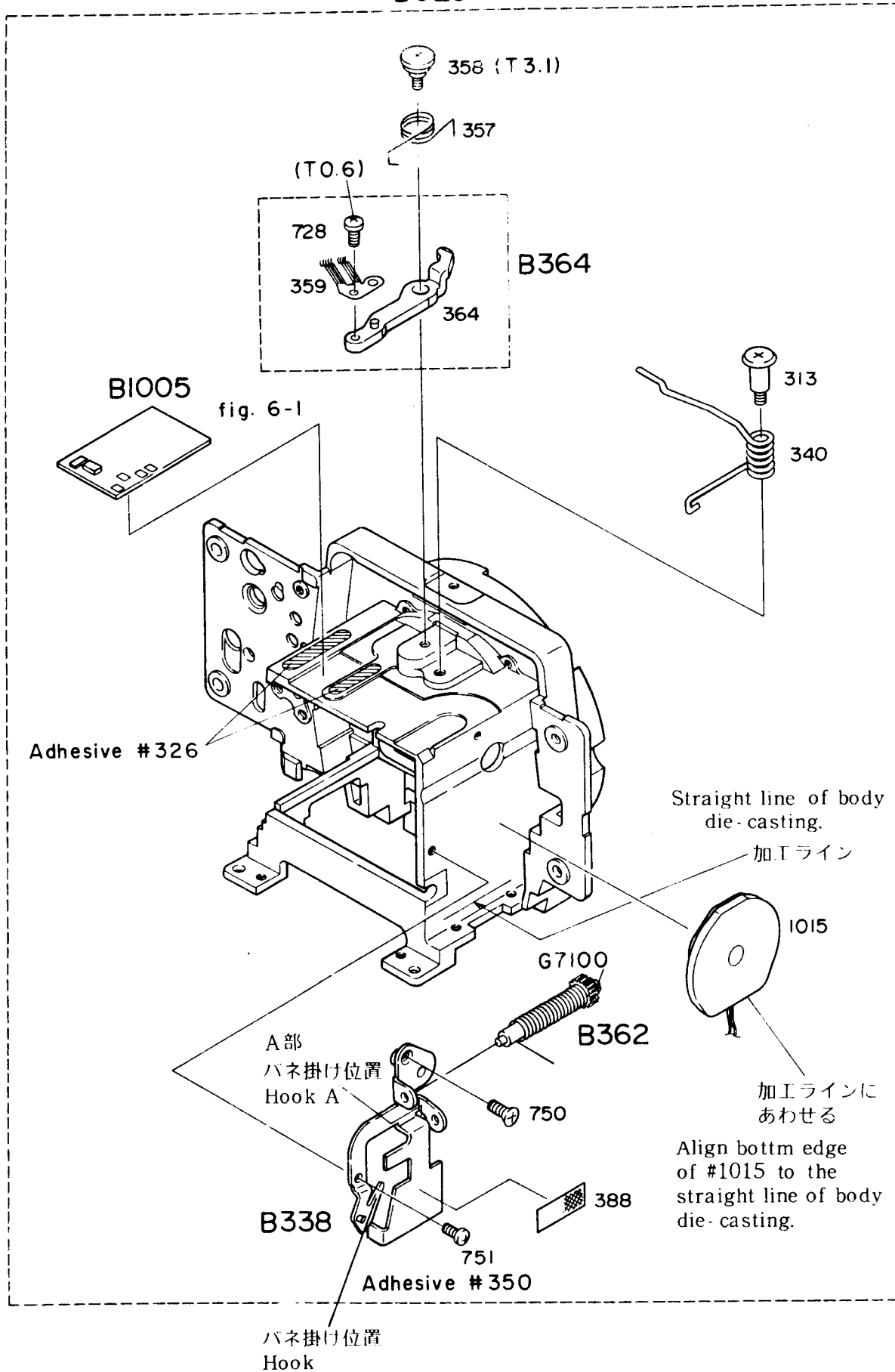


Fig. 6

Fig.5-1 Shutter speed dial brush gear installation

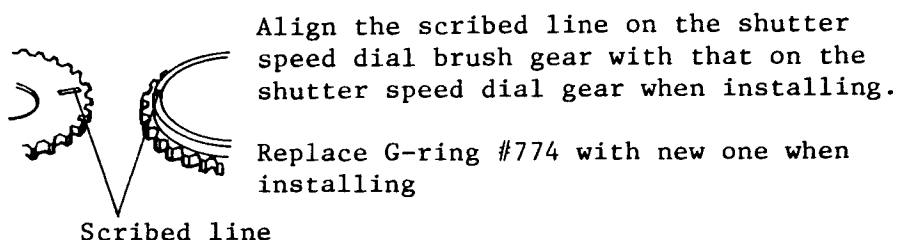
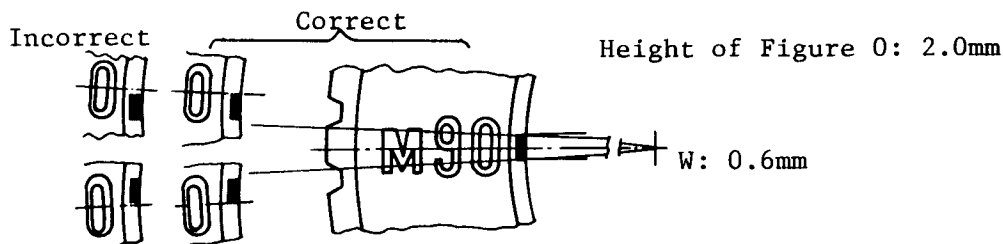


Fig.5-2 Shutter speed index positioning



Center of Figure 0 should be aligned with the shutter speed index.

Fig.5-3 Frame counter index, frame counter switch checking

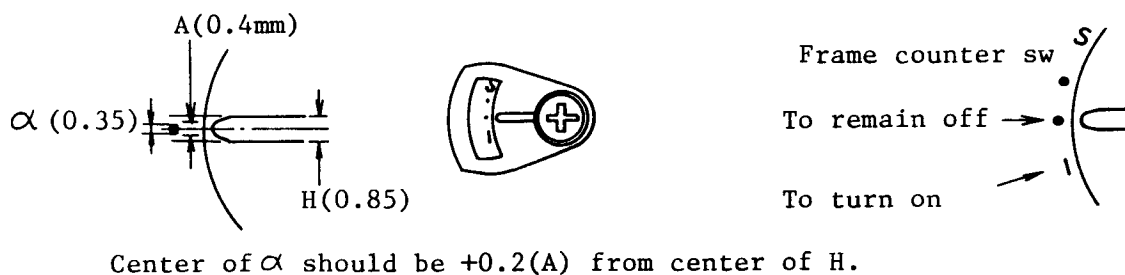
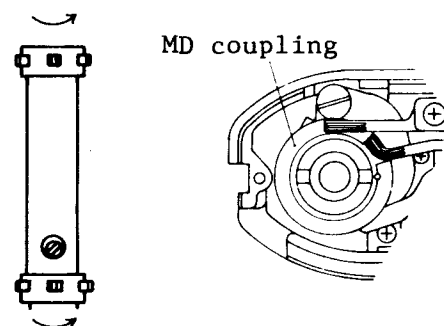


Fig.5-4 Film-advance base unit installation

Set the sprocket and MD coupling as shown in the right figure and mount the body die-casting onto Tool J15163. Then set the film-advance base unit and frame counter as shown in the figures below.

Bottom plate of Tool J15163 should be replaced with that of the FG-20.

Installation should be referred to the pertaining section of the repair manual for the EM.



Advance the sprocket teeth by one teeth to the allow direction.

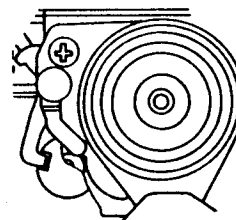
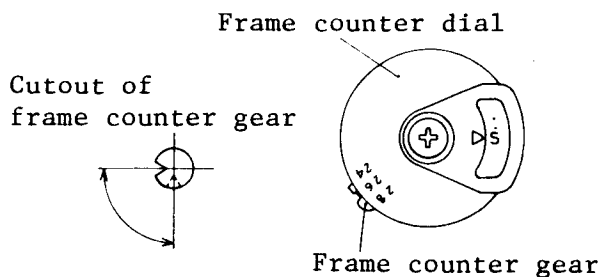
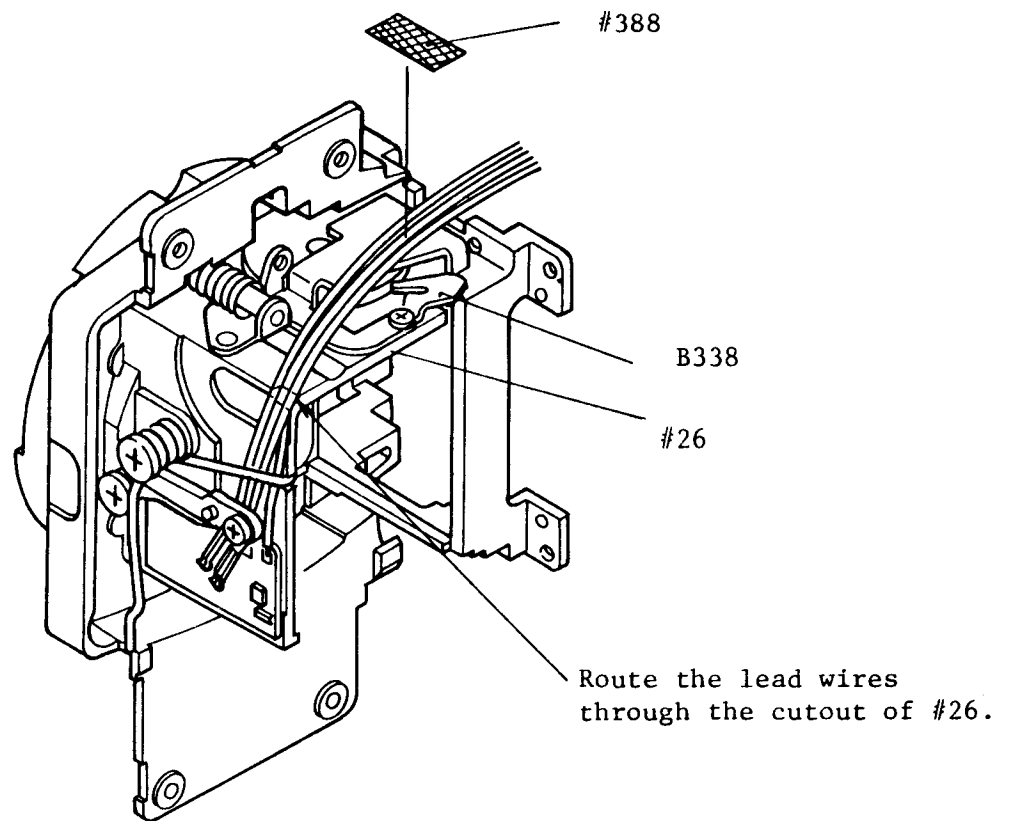
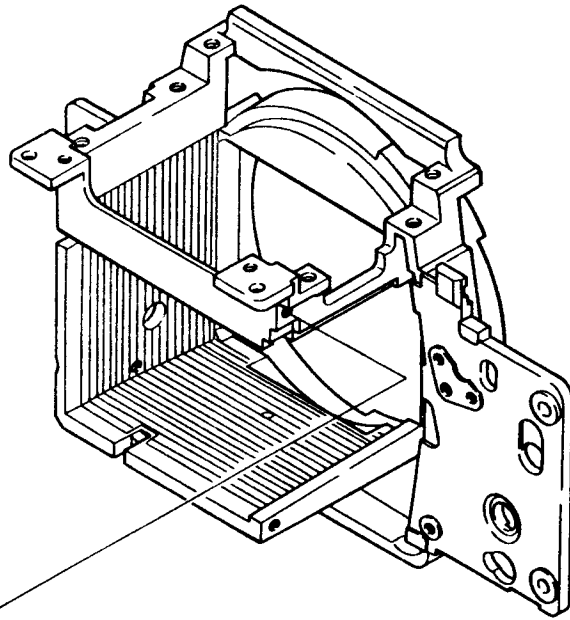


Fig.6-1 Route of fo base plate lead wires

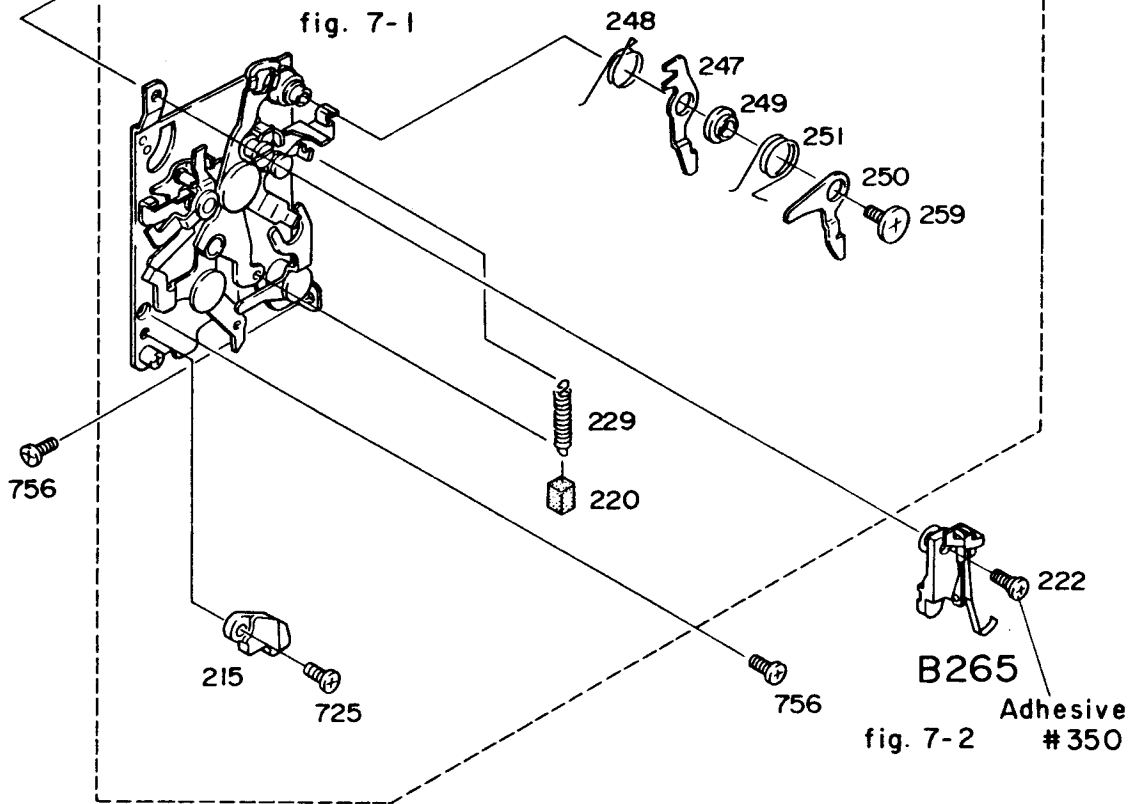


B026



B 201

fig. 7-1



B265

fig. 7-2
Adhesive
#350

Fig. 7

Fig.7-1 Mirror actuating unit adjustment

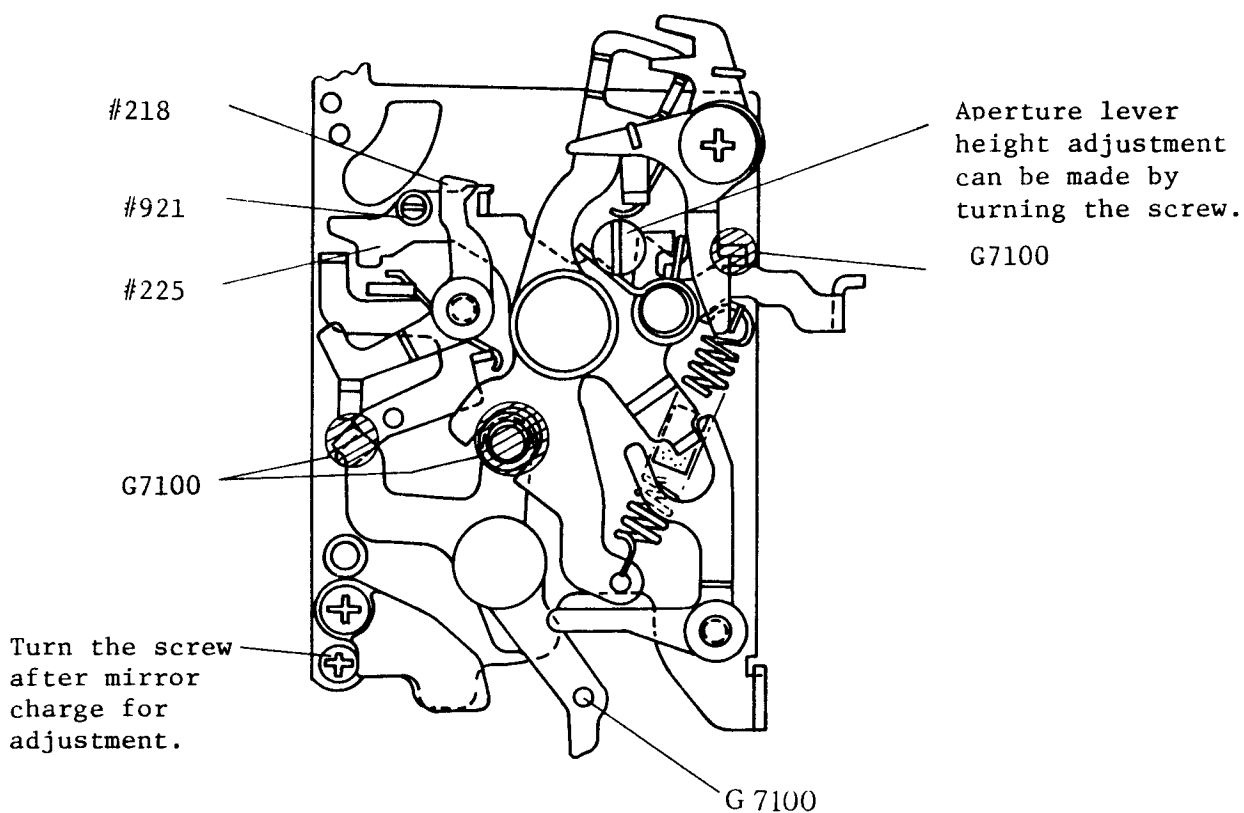


Fig.7-2 Mirror switch adjustment

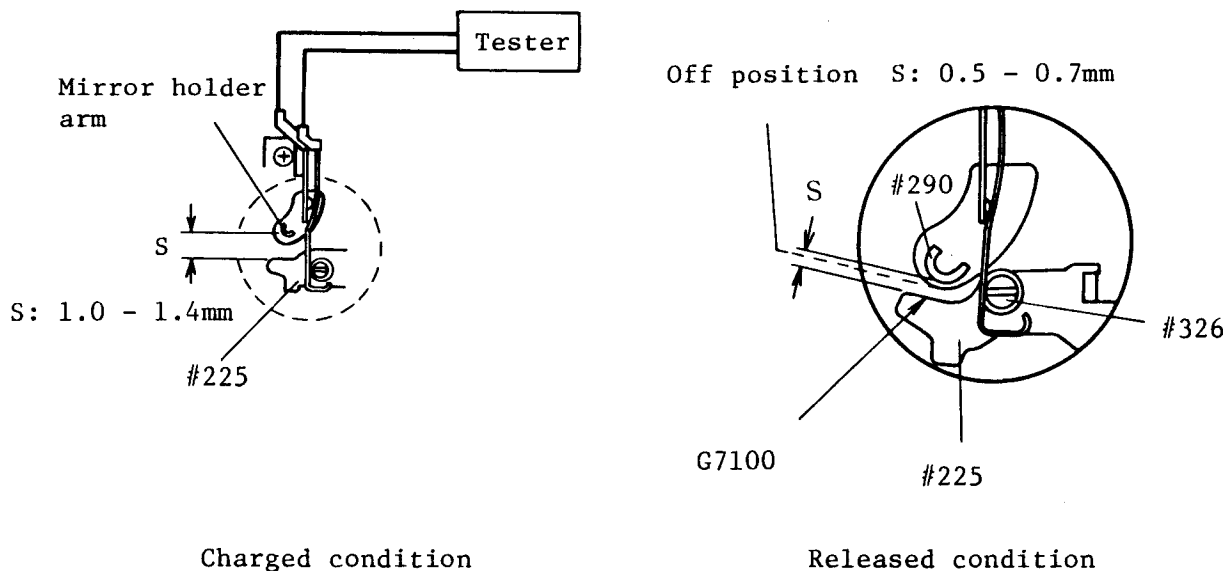
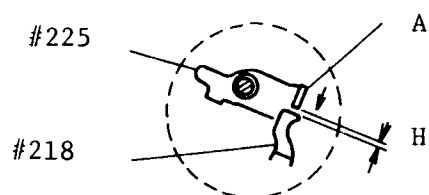
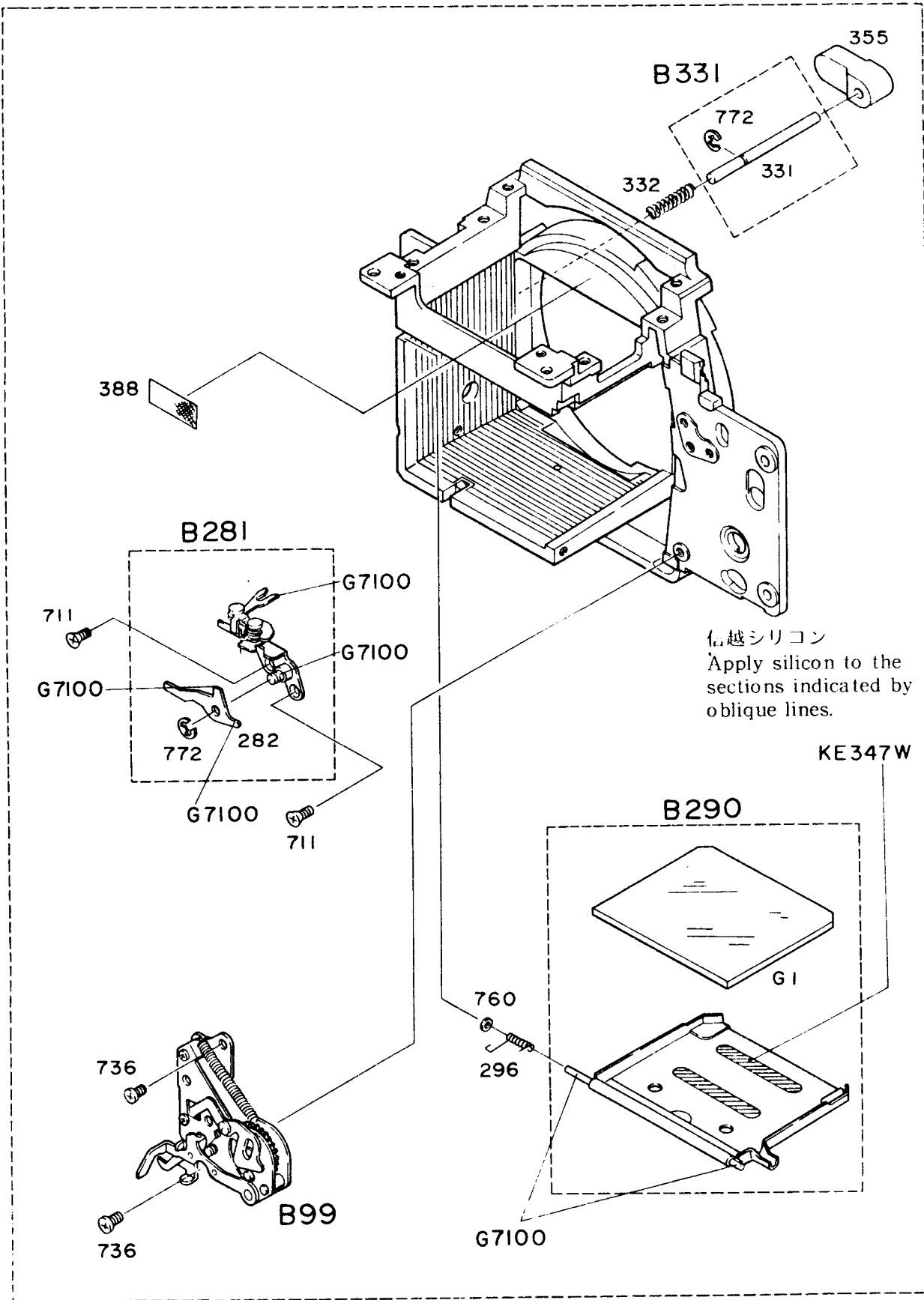


Fig.7-3 Adjustment of clearance between Mirror-up lever #225 and Bound stopper lever #218 in charged condition



Bend Section A of #225 to the arrow direction so that Clearance H becomes 0mm.

B026



信越シリコン
Apply silicon to the
sections indicated by
oblique lines.

KE347W

Fig. 8

B362 を反時計方向に
4.5 回転 (Fig 6)

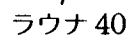


Fig. 9

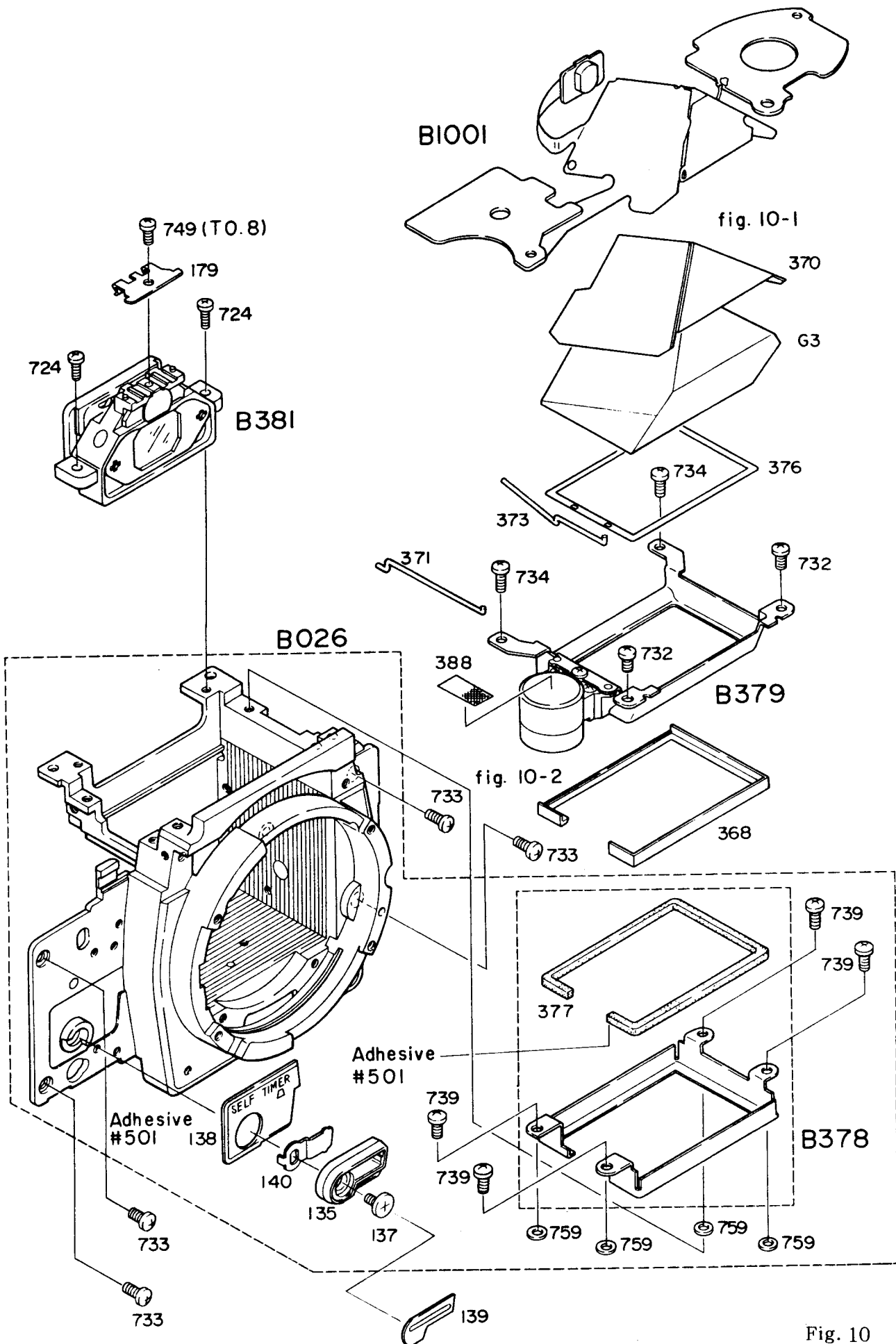


Fig. 10

Fig.10-1 Soldering of lead wires

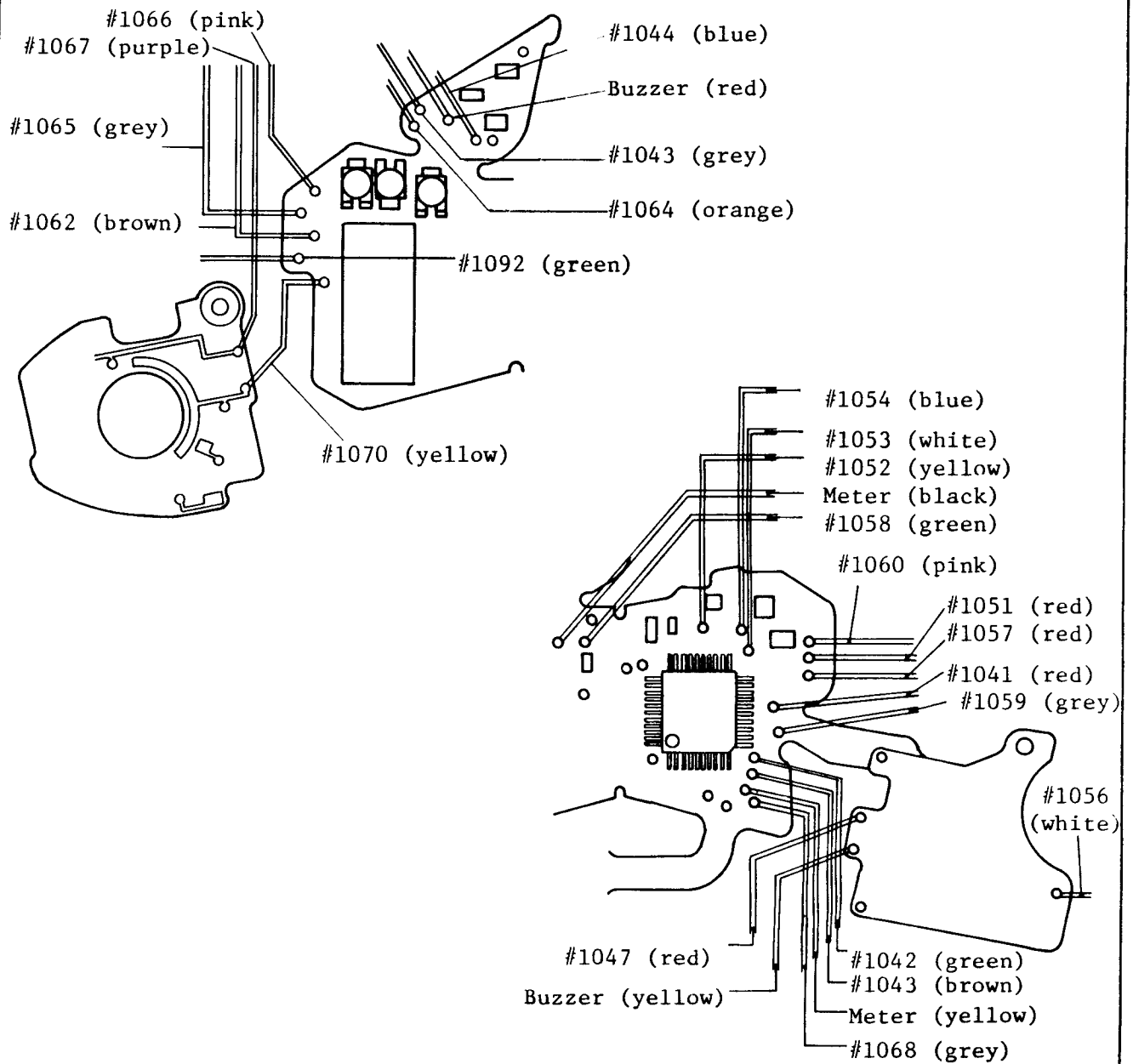
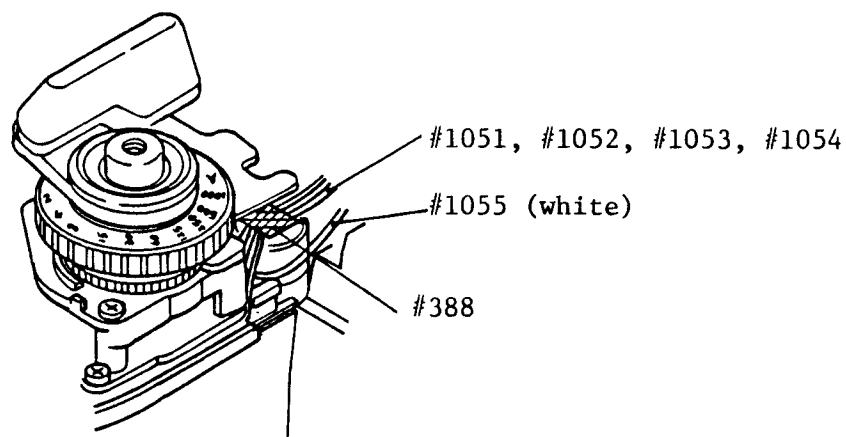


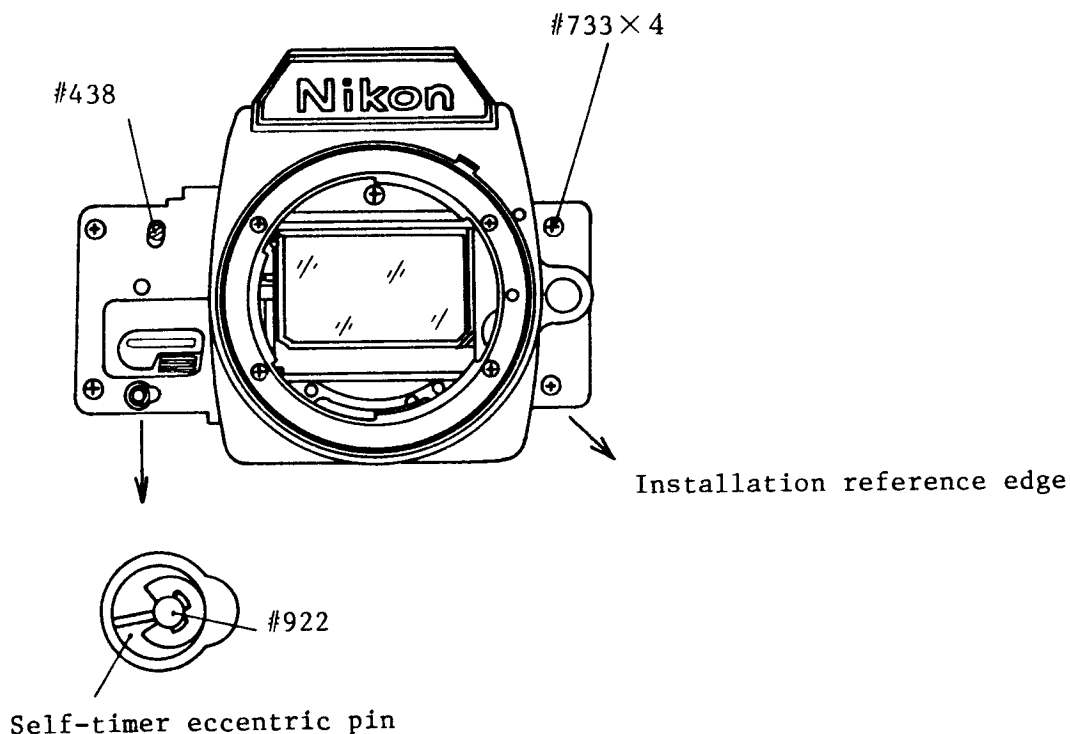
Fig.10-2 Route of lead wires



10-1 Front plate installation

Be sure to set the shutter unit to the charged condition before installing.

When installing, closely fit the right lower part of front plate to body die-casting in the direction of arrow.



T J11154

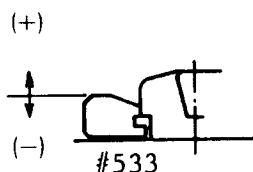
Shutter release start position

Shutter should be released when mirror rises to the position 1 - 3mm from mirror sponge.
Adjustment can be made by turning the self-timer eccentric pin.

Shutter release button stroke

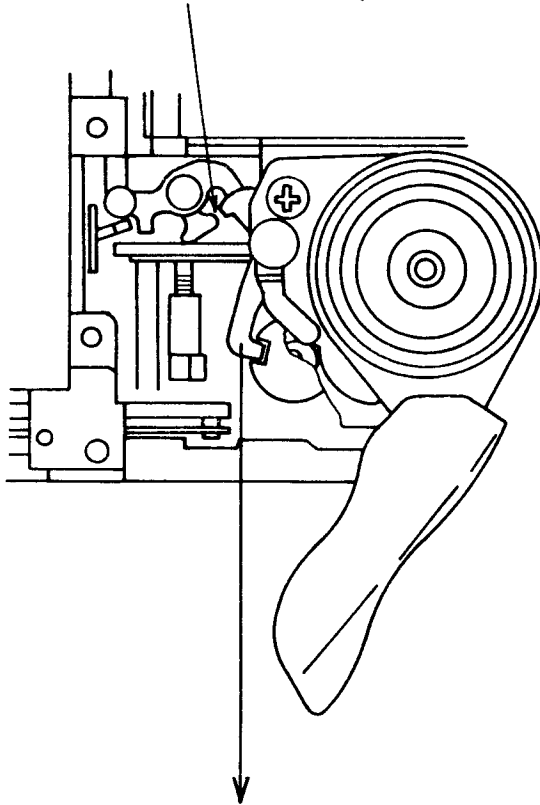
Standard: -0.2 - -0.6mm from the top of #533

Adjustment can be made by turning Slide lever eccentric pin #438.



10-2 Single frame and continuous shooting mechanism checking

Clearance to be provided



Single-frame film-advancing

When the film-advance lever is fully stroked, the tip of the sprocket stopper lever should entirely engage with the cutout of the sprocket stopper. At this time, the sprocket stopper lever should not come in contact with the release charge lever.

Continuous film-advancing

Both shutter and mirror should not start to operate when the tip of the sprocket stopper lever enters mid-way into the cutout of the sprocket stopper.

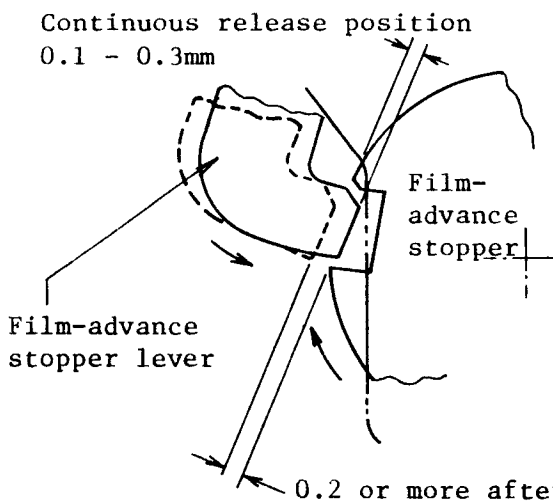
Both shutter and mirror should not start while the film-advance lever is being stroked.

Set the shutter speed dial to B before checking.

Depressing the shutter release button, slowly stroke the film-advance lever with finger-pressure onto the sprocket and visually inspect the tip of the sprocket stopper lever for proper engagement with the sprocket stopper the moment both shutter and mirror start.

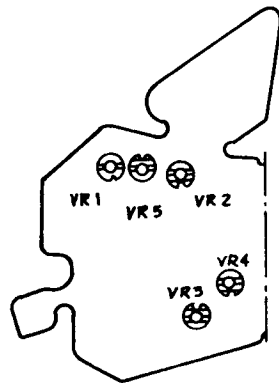
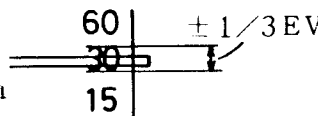
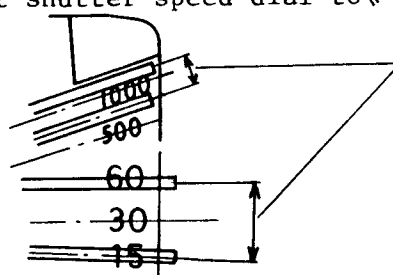
Adjustment can be made by re-locating the film-advance base plate.

To delay mirror/shutter releasing time, shift the film-advance base plate toward lens mount direction.



Adjustments

Tools: Standard lens 50mm F1.8, Tool top cover J15236,
fo signal adjusting tool J18073, Speedlight SB-E

1	Meter needle indication for blank exposure		To indicate C90 before frame counter reaches 1 on Auto mode.	
Set frame counter to 1 or more				
2	Shutter speeds delivery on M mode	VR2	Set shutter speed dial to 1/30. 31.3ms (29.2 - 33.5ms)	
3	Shutter speeds delivery on A mode	VR1	28.2ms (26.3 - 30.2ms) A mode, ASA 100, F4, EV9	
Checking			ASA 100 EV15, F5.6: 0.88ms (0.56 - 1.38ms) EV6, F8: 901ms (683 - 1189ms)	
4	Meter level adjustment	VR3	Setting: A mode, ASA 100, F5.6, EV6 Standard: Meter needle should correctly indicate 1/2 sec.	
5	Meter RV6	VR4	Setting: A mode, ASA 100, F5.6, EV15 Standard: Meter needle should correctly indicate 1/1000.	
Check Items' 4 and 5 again.				
6	Meter accuracy checking		Setting: A mode, ASA 100, F4, EV9 Meter needle should be positioned within a range of arrow.	
7	Exposure compensation checking		Setting: A mode, ASA 100, F4, EV9 Meter needle should indicate 1/30 sec. +2+0.3EV when exposure compensation button is depressed.	
8	Audible warning checking		Set shutter speed dial to 1000 .  Warning sound should appear when meter needle is located within a range of arrow.	
9	Sync speed checking		Attach the SB-E to the camera and set shutter speed dial to A. Tolerance: 9.5 - 17ms Ready-light LED should light up when the speedlight is charged.	
10	fo shift adjustment	VR5	Connect S2 terminal of J18073 to Lead wire #1063 (blue) of the camera, and G terminal of J18073 to the body die-casting respectively via alligator-clip cords. Then connect (+) and (-) terminals of digital-voltmeter to +V and G terminals of J18073 respectively. Standard: 1317+5mV (ASA 100, F5.6)	

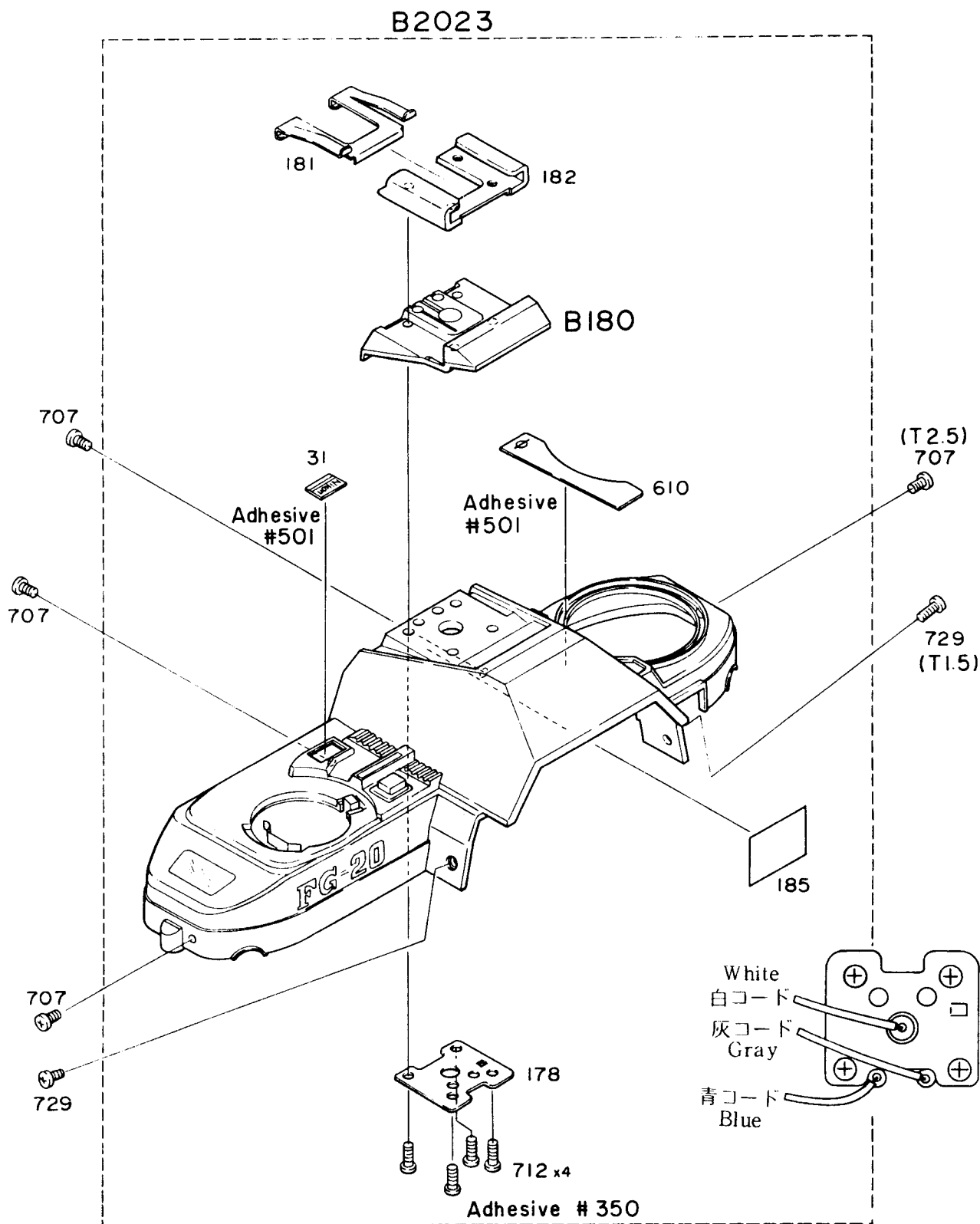


Fig 11

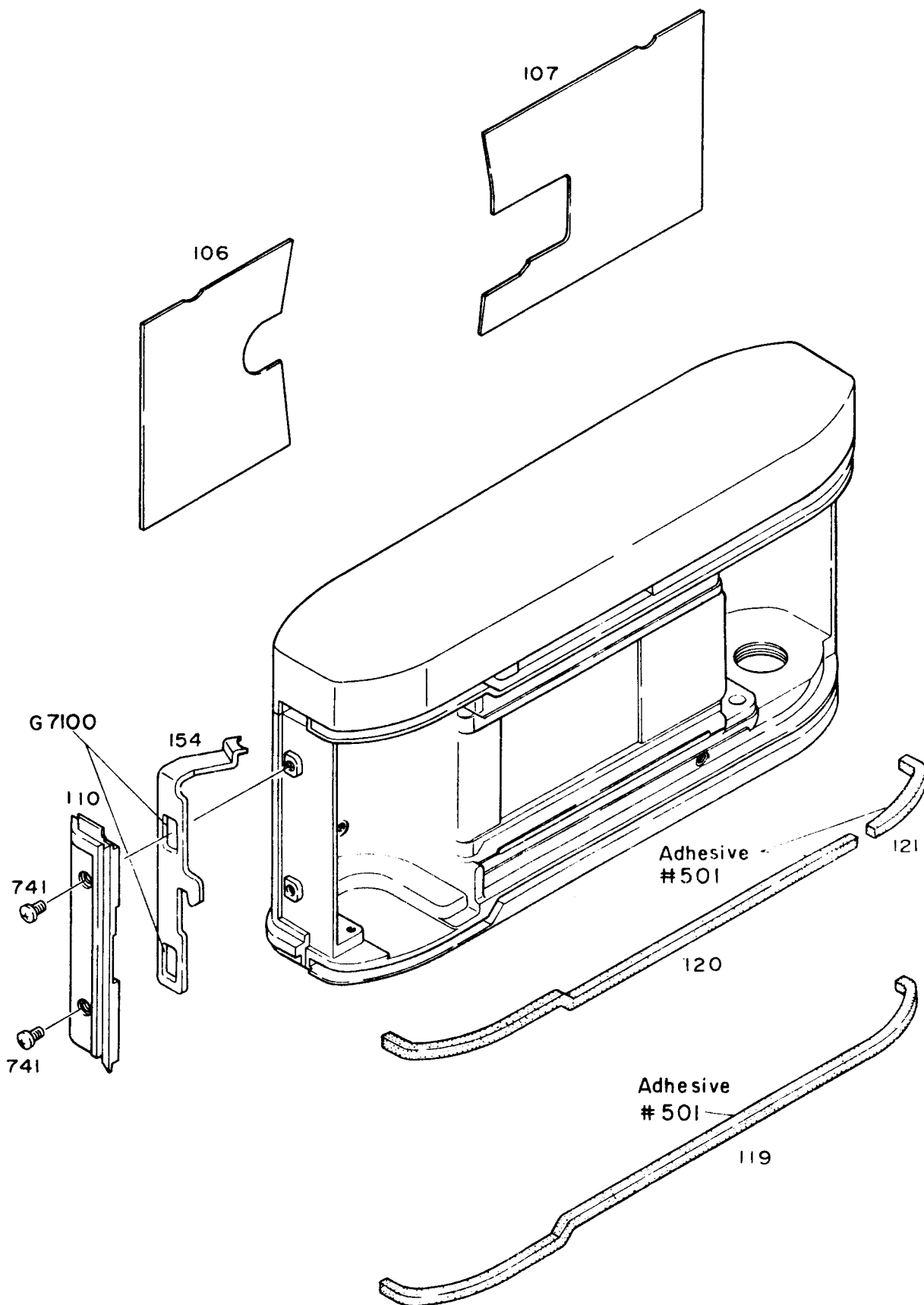


Fig. 12

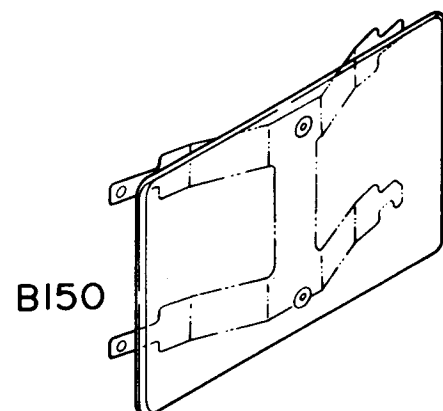
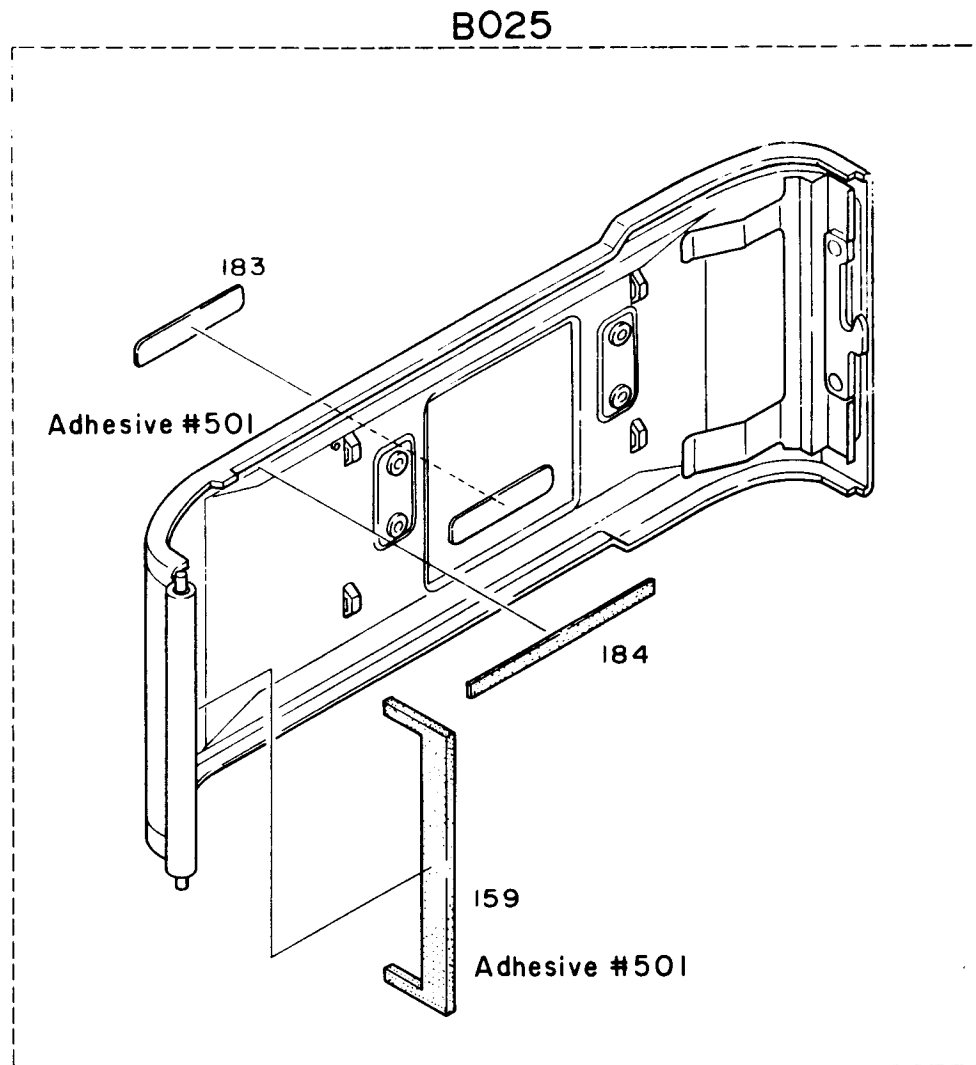
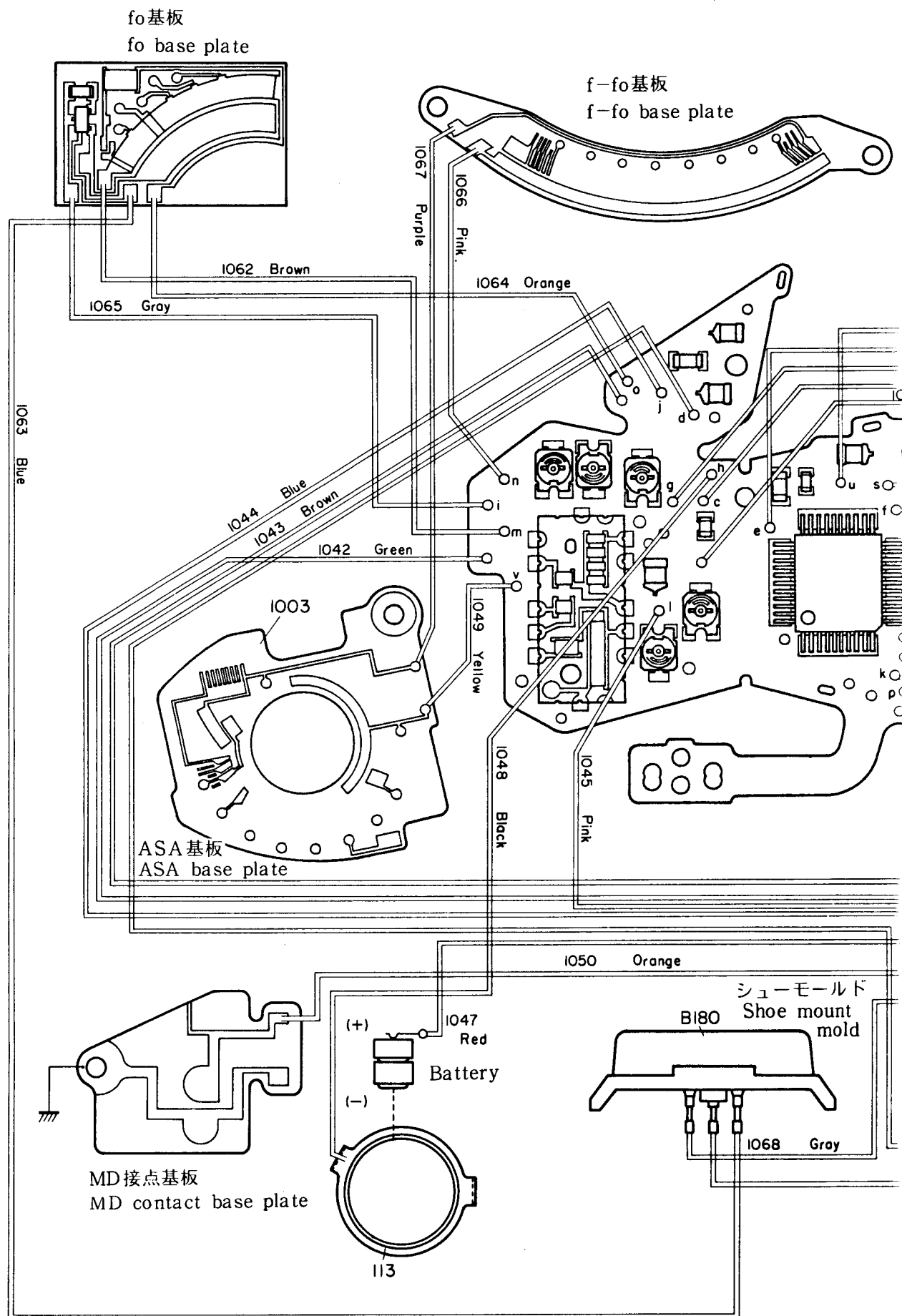


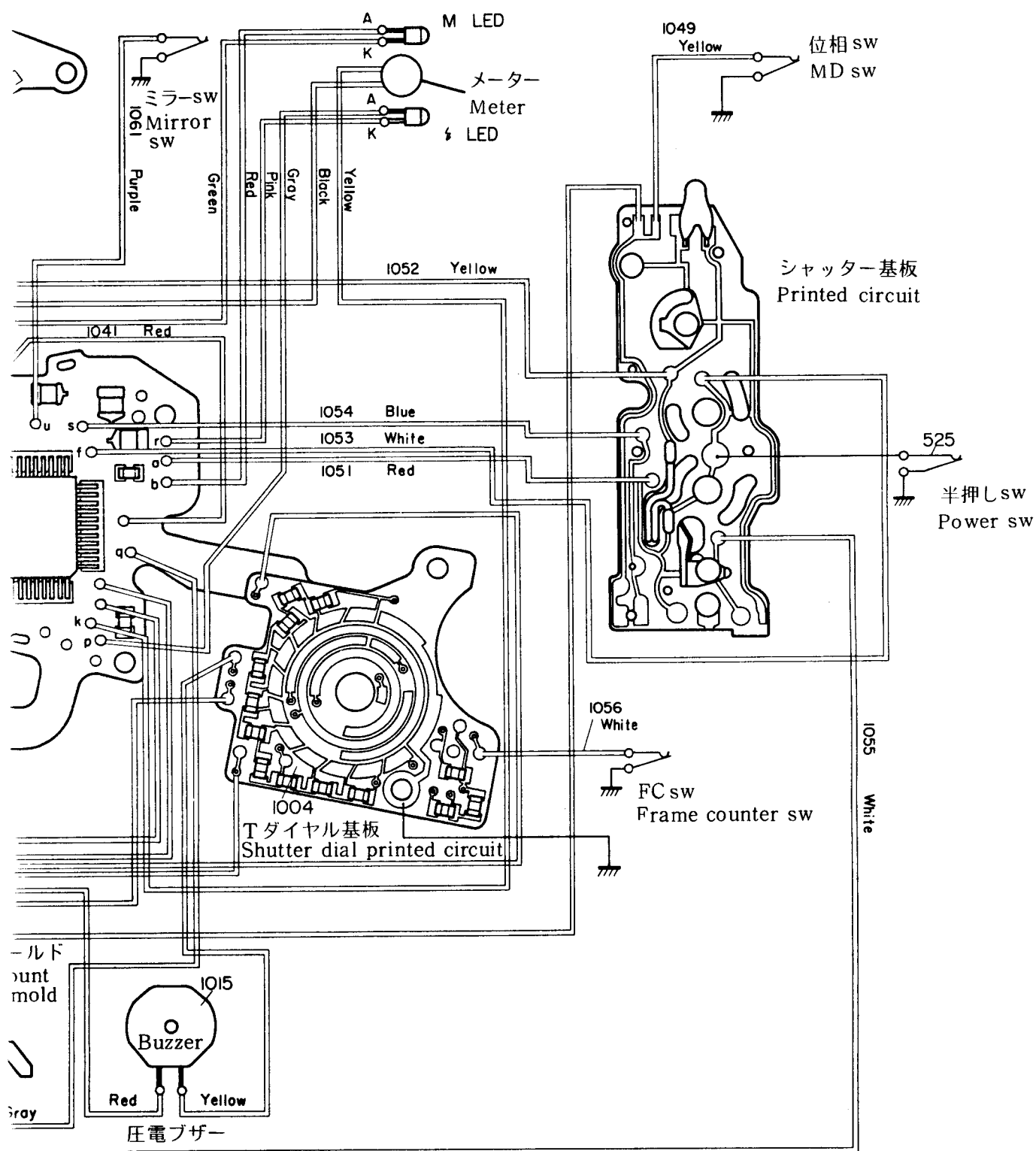
Fig. 13

ELECTRIC CIRCUIT

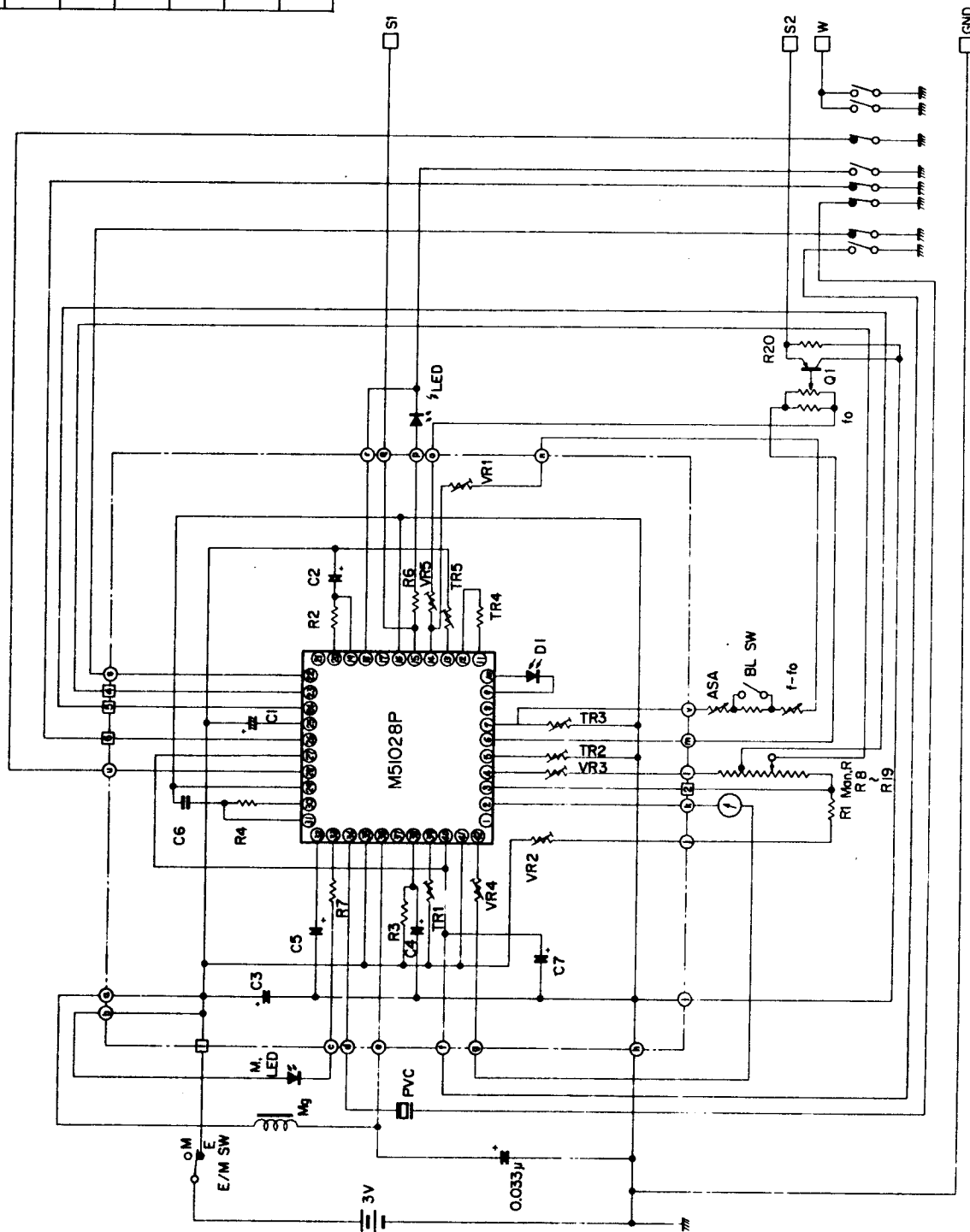
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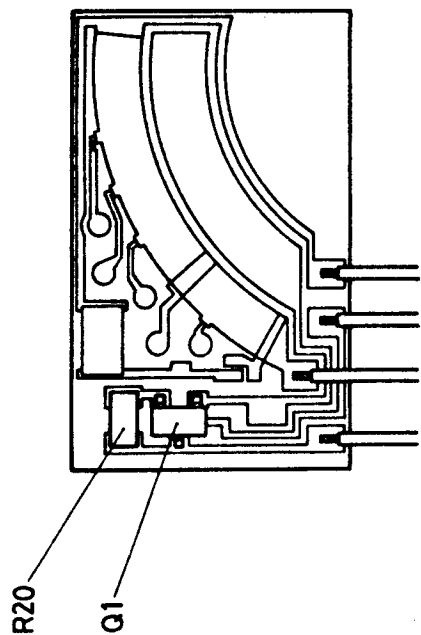
〔 1 〕 実体配線図 WIRING DIAGRAM



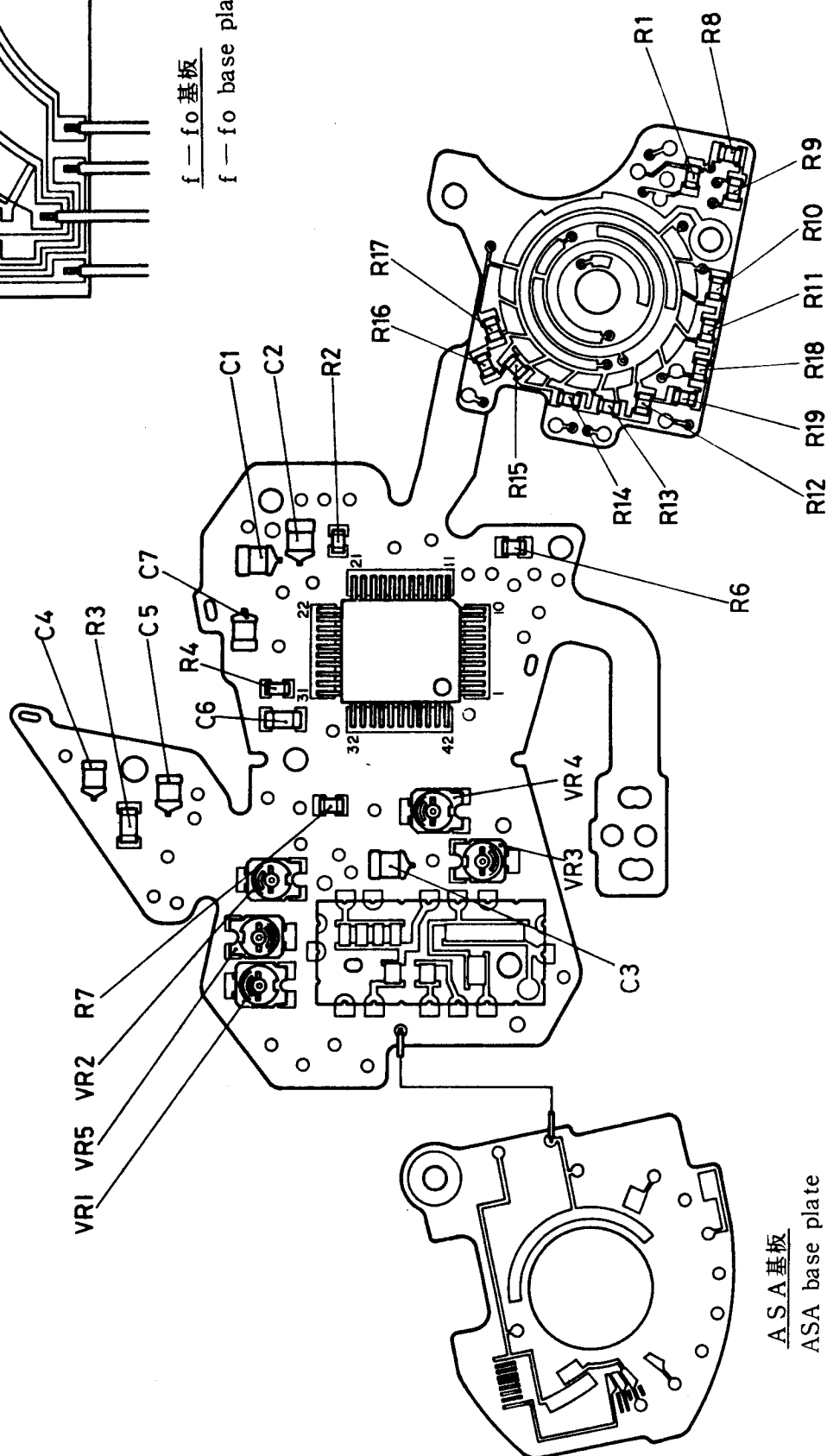


H sw	半押 sw Power sw
T sw	トリガー sw Trigger sw
SE sw	音消し sw Silence sw
FC sw	カウンタ— sw Frame counter sw
R sw	レディ sw Ready - light sw
M sw	ミラー sw Mirror sw
E/M sw	電源切替 sw Power ON/OFF sw



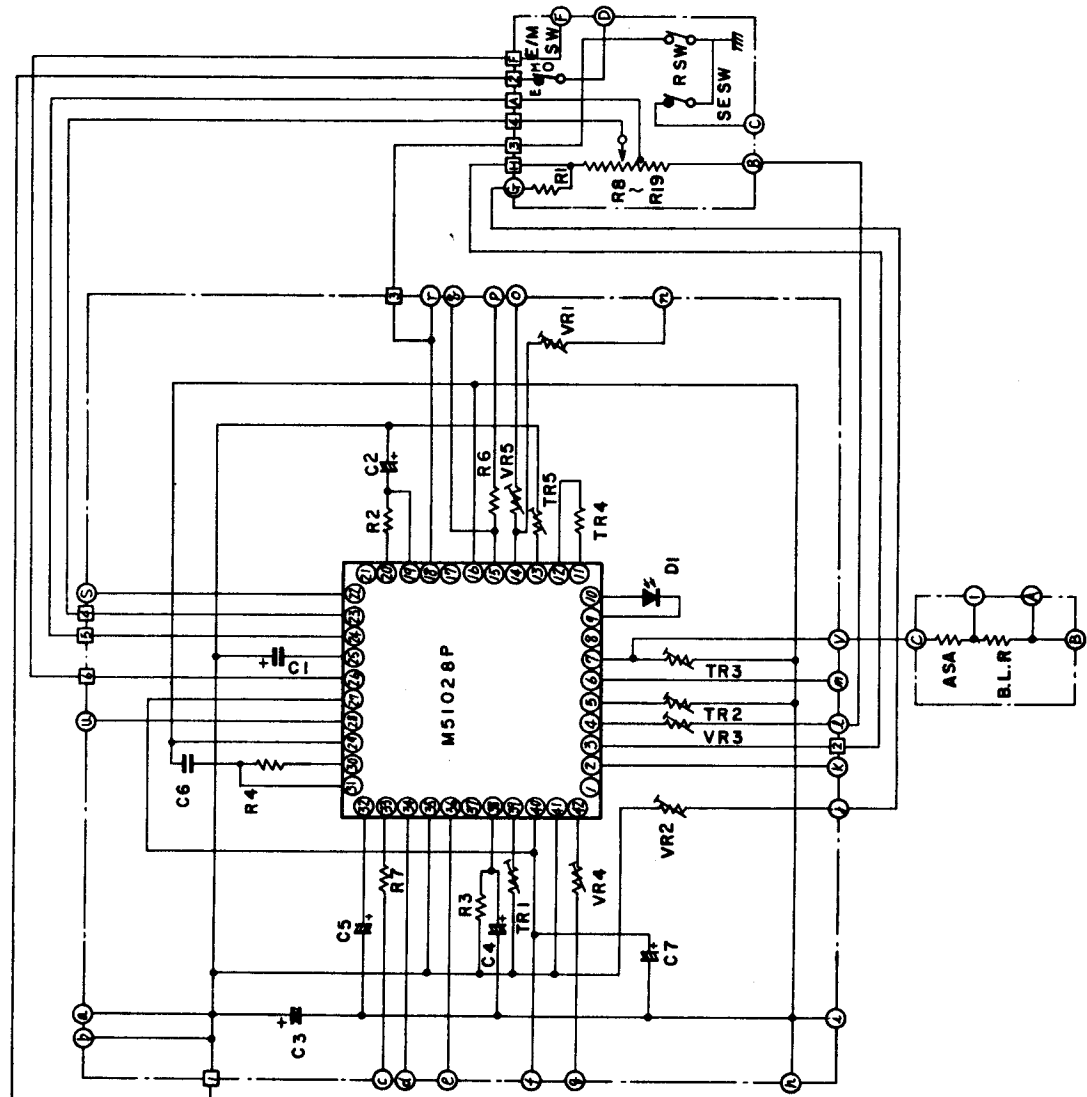


f — f o 基板
f — f o base plate



ASA 基板
ASA base plate

Tダイヤル基板
Shutter dial base plate



Circuitry parts list

*1: Shutter speeds delivery on Auto mode

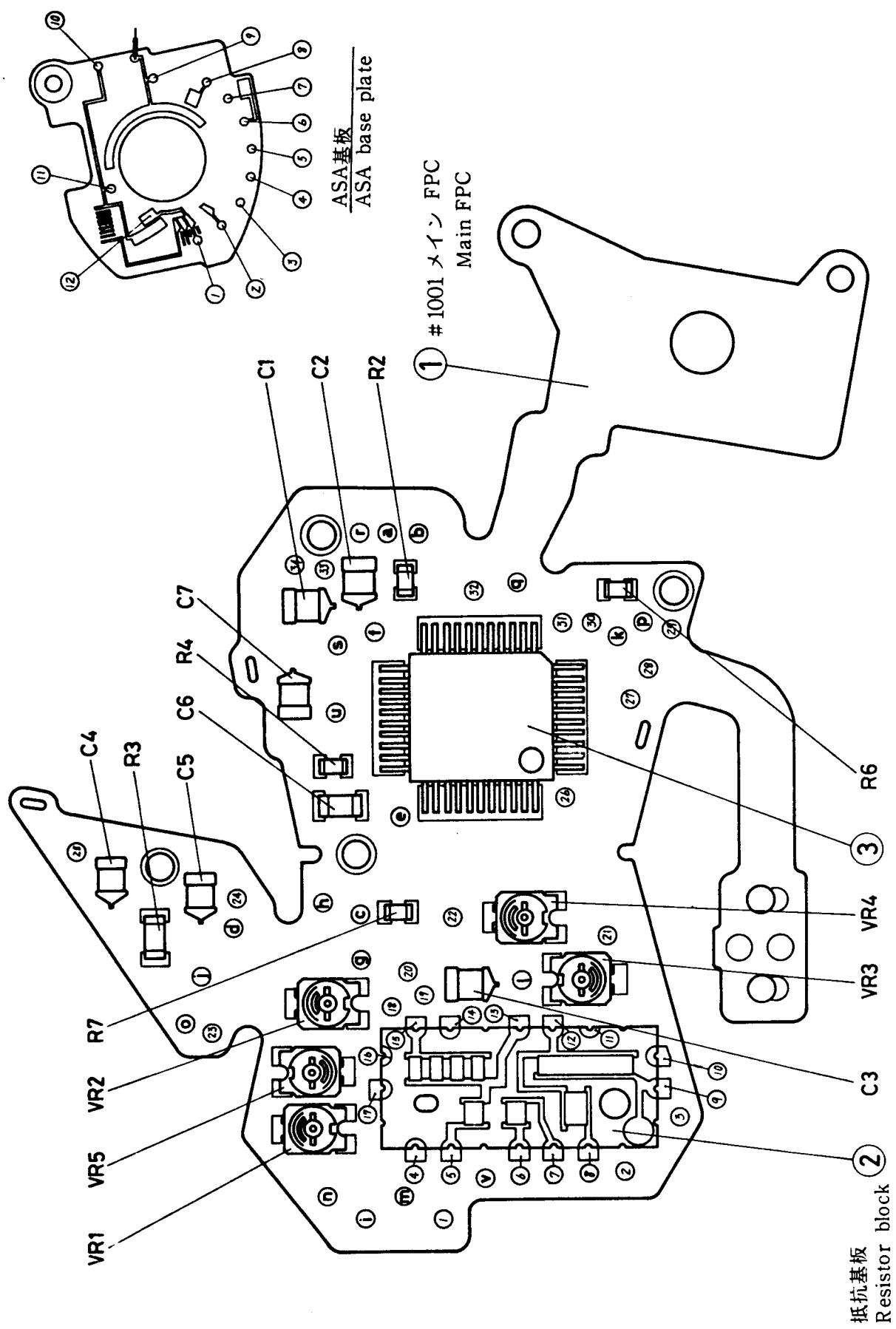
*2: Shutter speed delivery on Manual mode

Index		Name	Index		Name
VR1	6.8K	*1	R1	4.7K	Manual resistor
VR2	4.7K	*2	R2	180	Trigger resistor
VR3	4.7K	Meter shift	R3	9.1M	Power hold resistor
VR4	680	Meter δ	R4	240K	4kHz oscillation resistor
VR5	10K	fo shift	R6	1K	"M" LED resistor
			R8	910	Shutter dial resistor
Q1	PNP	fo transistor	R9	910	- ditto -
			R10	910	- ditto -
C1	3.3 μ	Memory condenser	R11	910	- ditto -
C2	1.0 μ	Timer condneser	R12	910	- ditto -
C3	6.8 μ	Power source condenser	R13	910	- ditto -
C4	4.7 μ	Power hold condenser	R14	910	- ditto -
			R15	910	- ditto -
C5	4.7 μ	2.5Hz oscillation condenser	R16	910	- ditto -
			R17	910	- ditto -
C6	2200P	4kHz oscillation condenser	R18	470	- ditto -
			R19	430	- ditto -
C7			R20	2.2M	fo resistor

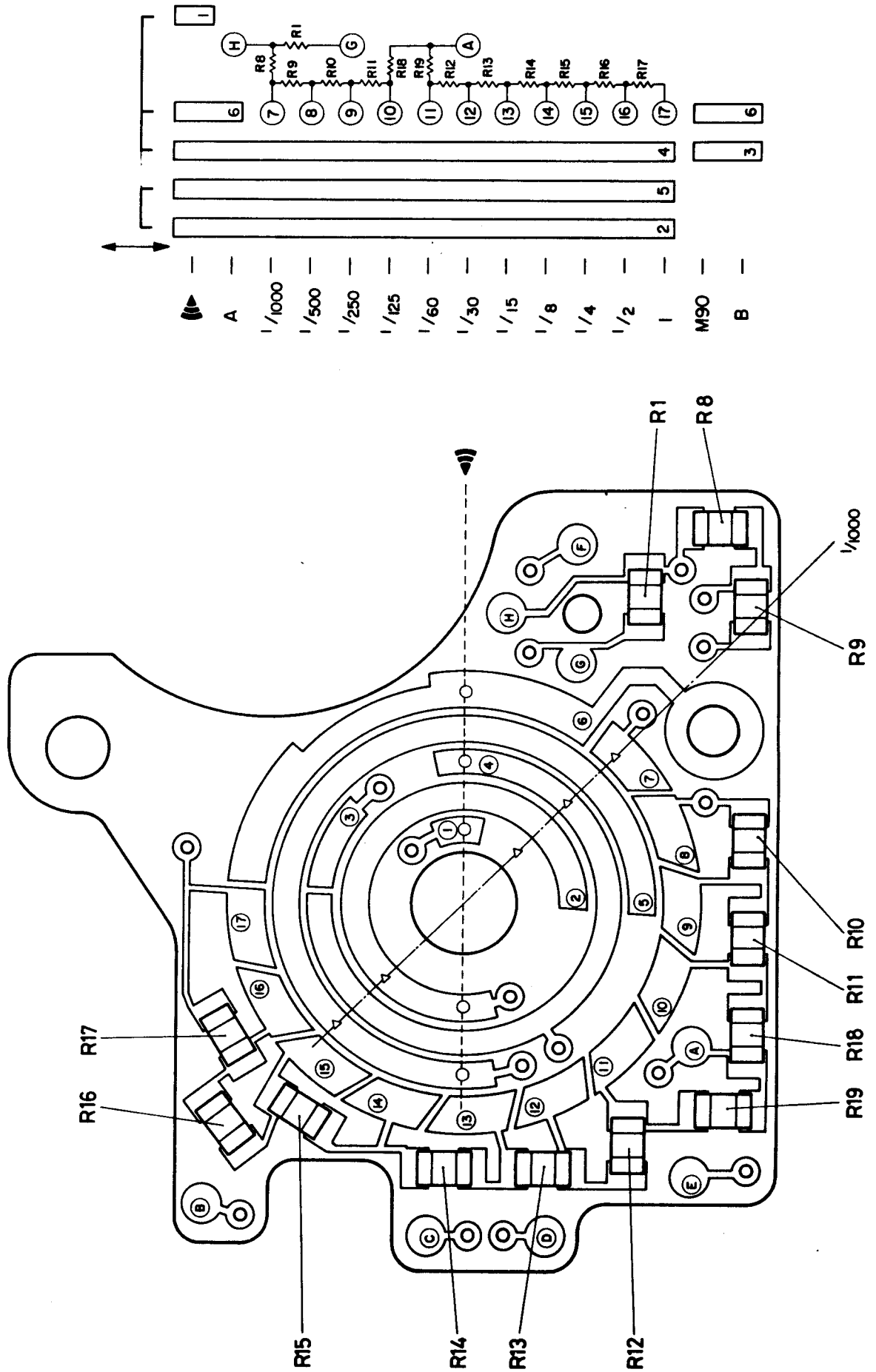
IC pin

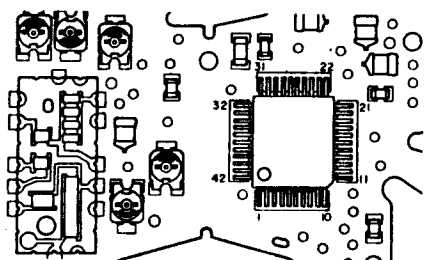
*3: Ready-light control

No.	Name	No.	Name	No.	Name
1	NC	15	Strobo input	29	GND2
2	Meter output 1	16	GND1	30	4kHz R
3	1/2000	17	NC	31	4kHz C
4	Meter shift	18	*3	32	2.5Hz C
5	Manual δ	19	Timer 1	33	"M" LED
6	fo	20	Timer 2	34	PVC
7	120mV bias	21	NC	35	Vcc2
8	NC	22	Trigger sw	36	Shutter Mg
9	Metering output 1	23	Manual input	37	GND2
10	Metering output 2	24	1/90	38	Power hold
11	Metering output	25	Memory	39	B.C
12	1.2V bias	26	Frame counter sw	40	Power sw
13	Auto δ	27	D.B	41	Vcc1
14	Information input	28	Mirror sw	42	Meter output 2



ダイヤル基板
Shutter dial printed circuit





I. Normal condition

1. Settings: LV9, ASA 100, F4, 1/30 sec.
Lcc 3V, Frame counter switch (FCWS) ON,
Exposure compensation switch OFF
2. Metering: Power switch (HSW) ON, Mirror
switch (MSW) ON, Trigger switch
(TSW) ON


Shutter release (mirror-up): HSW ON, MSW
OFF, TSW ON

II. Abbreviations: 1. Approx.: $\pm 0.1V$, 2. : The voltage is not constant

III. Measurement voltage: GND reference

Index	Name	Metering	Shutter release	Remark	Index	Name	Metering	Shutter release	Remark
1	NC	NC	NC		21	NC	NC	NC	
2	Meter output 1	Approx. 1.6	Approx. 1.6	*1	22	TSW	0	0	*4
3	1/2000	2.7-2.8	2.7-2.8		23	M mode input	2.4-2.6	2.4-2.6	*5
4	Meter shift	Approx. 2.3	Approx. 2.3		24	1/90	2.5-2.7	2.5-2.9	
5	Maual	0.39-0.63	0.39-0.63		25	*6	Approx. 2.5		
6	fo	0.9	0.9		26	FCSW	0	0	
7	120mV bias	0.10-0.14	0.10-0.14		27	HSW	0	0	
8	NC	NC	NC		28	MSW	0	0.6	
9	*7	0.4-0.5	0.4-0.5		29	GND2	0	0	
10	*8	0.4-0.5	0.4-0.5		30	4kHz R	2.9-3.0	2.9-3.0	
11	*9	Approx. 0.7	Approx. 0.5		31	4kHz C	Approx. 0.6	Approx. 0.6	
12	1.2V bias	Approx. 1.2	Approx. 1.2		32	2.5 kHz C	0	0	
13	Auto	2.4-2.6	2.2-2.4		33	*10	0-0.2	Approx. 0.6	
14	*11	Approx. 0.5	Approx. 0.5		34	PVC	2.4-3.0	2.4-3.0	
15	*12	0	0	*2	35	Vcc 2	3.0	3.0	
16	GND 1	0	0		36	*13	3.0	0.2 or less	
17	NC	NC	NC		37	NC	NC	NC	
18	*14	0	0		38	Power hold	0.2 or less	Approx. 2.4	
19	Timer 1		2.8-3.0	*3	39	*15	Approx. 2.4	Approx. 2.4	
20	Timer 2		2.9-3.0	*3	40	HSW	0	0	
					41	Vcc 1	3.0	3.0	
					42	*16	1.3-1.4	1.3-1.4	

*1: FCSW OFF on Auto mode (approx. 2.3V) *2: 2.6-3.4V while ready-light LED lights up

*3:  *4: OFF: closing curtain travel (0.7V) ON: film-advancing (0V)

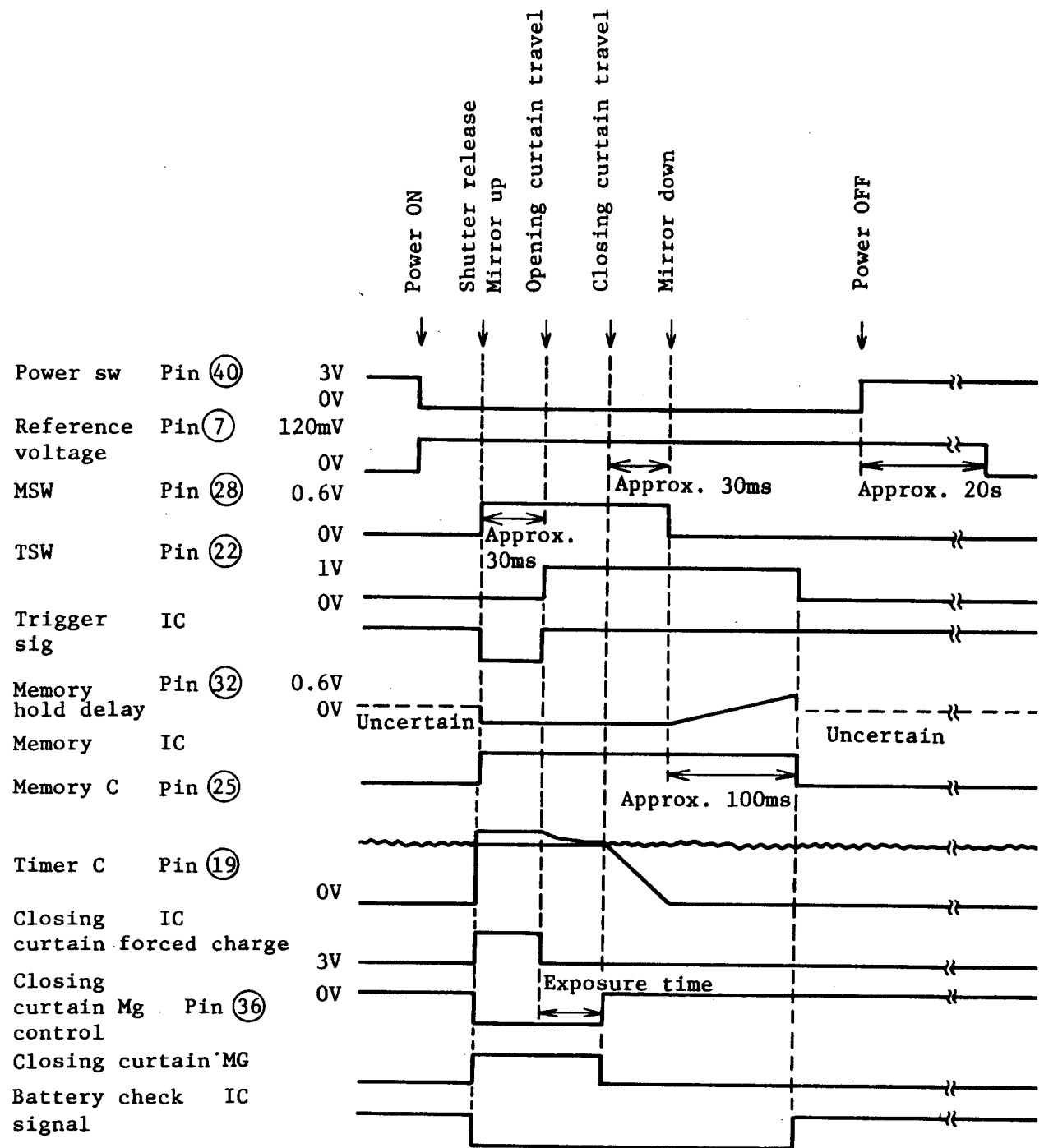
*5: Auto mode: 0V, Manual 1/1 sec.: approx. 2.35V, Manual 1/1000 sec.: approx. 2.7V

*6: Memory condenser, *7: Metering input 1, *8: Metering input 2, *9: Metering output

*10: M mode LED, *11: Information input, *12: Strobo input, *13: Shutter Mg

*14: Ready-light control, *15: Battery check, *16: Metering output 2

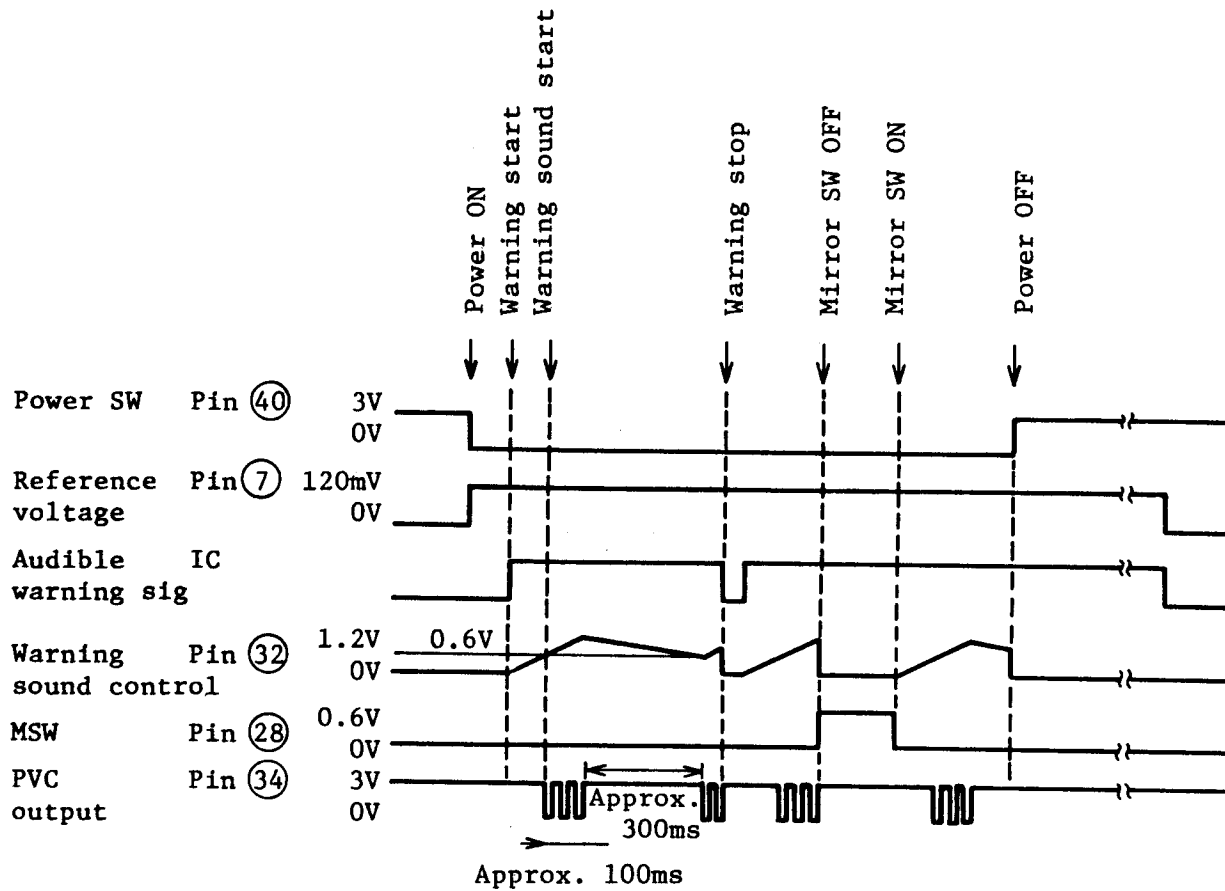
1. Shutter release sequence



Warning sound is disappeared while memory is held.

Manual mode indication LED turns off while MSW is off.

2. Audible warning sequence



When FCSW is off, the wave of FCSW is equal to that of Audible warning signal.

1. Frame counter switch (FCSW)

Frame counter		S, ., .	1 or more
FCSW		OFF	ON
Shutter speed	Auto	1/90	NORMAL
	Manual	NORMAL	
Meter needle	Auto	C90	NORMAL
	Manual	NORMAL	

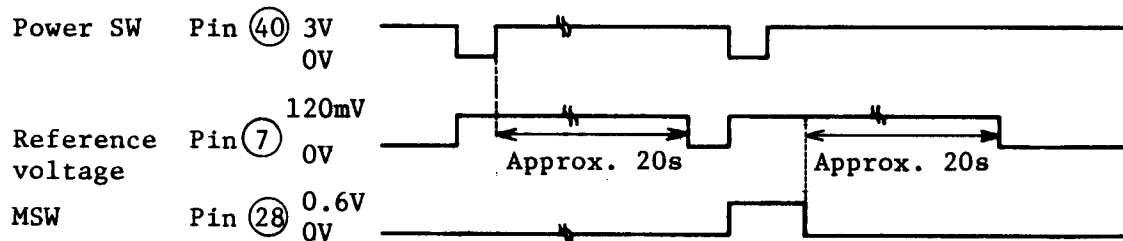
When the frame counter switch remains off on Auto mode, FRAME COUNTER SIGNAL is inputted into the meter so that the meter needle can indicate C90.

The voltage of Pin ②⑥ : 0V (FCSW ON)

Approx. 0.3V (FCSW OFF)

2. Power switch , Bias

Depressing the shutter release button halfway turns the power switch on to operate BIAS CIRCUIT. When BIAS CIRCUIT is in operation, the reference voltage generates at Pin ⑦.



BIAS CIRCUIT turns off after approx. 20 sec. from the power switch off. When the mirror switch (MSW) is held off after 20 sec. power hold timing, power hold will start again when MSW turns on.

3. Refer the sequences of the mirror switch (MSW), trigger switch (TSW) and others to TIMING CHART.

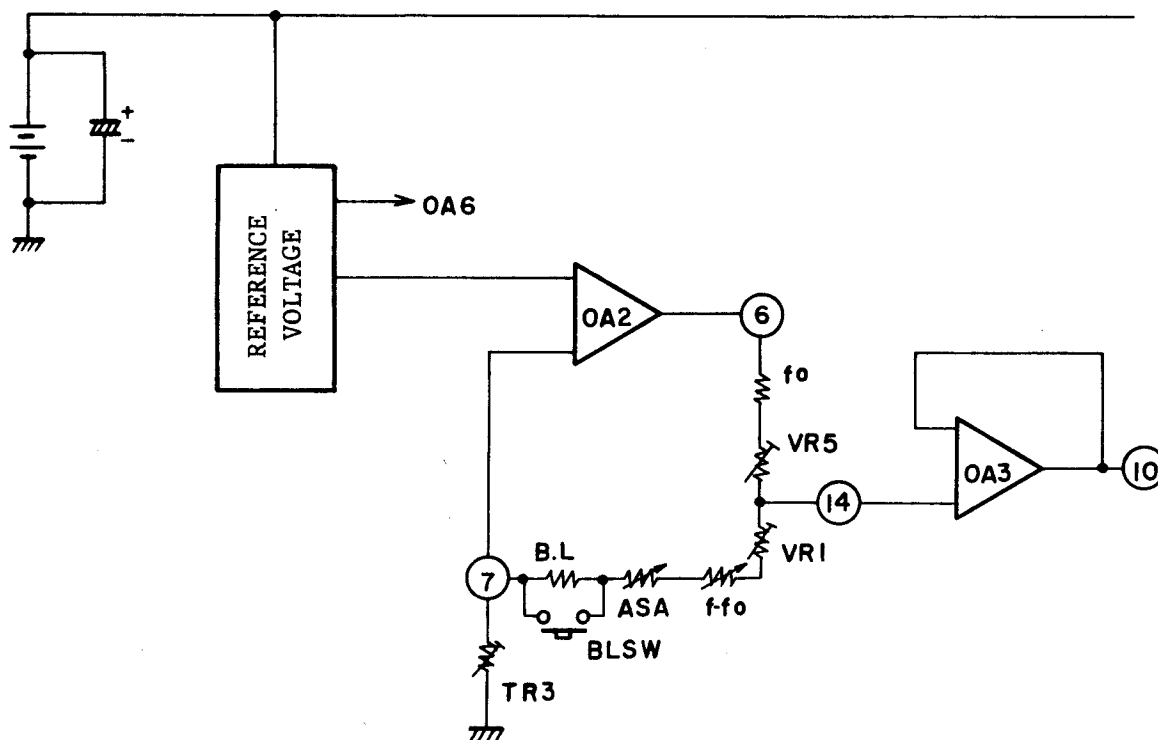
4. Information resistor input

The information resistors for ASA and f-fo are connected directly and they are adjusted by RESISTOR TR3 to shift by 36mV/SV, 36mV/AV. RESISTOR TR3 generates regulated current of 40 μ A by ASA γ adjustment, VARIABLE RESISTOR VR1 is a level shift resistor of shutter speed control on Auto mode, and the voltage of VR1 is added to the information resistor voltage. RESISTOR B.L. is an exposure compensation resistor and turning the exposure compensation switch (BLSW) on makes voltage of 72mV short-circuit to decrease the information resistor voltage by 2EV. The higher ASA value or larger aperture will increase the voltage of Pin ⑭. Hence, the higher shutter speed increases the voltage of Pin ⑭.

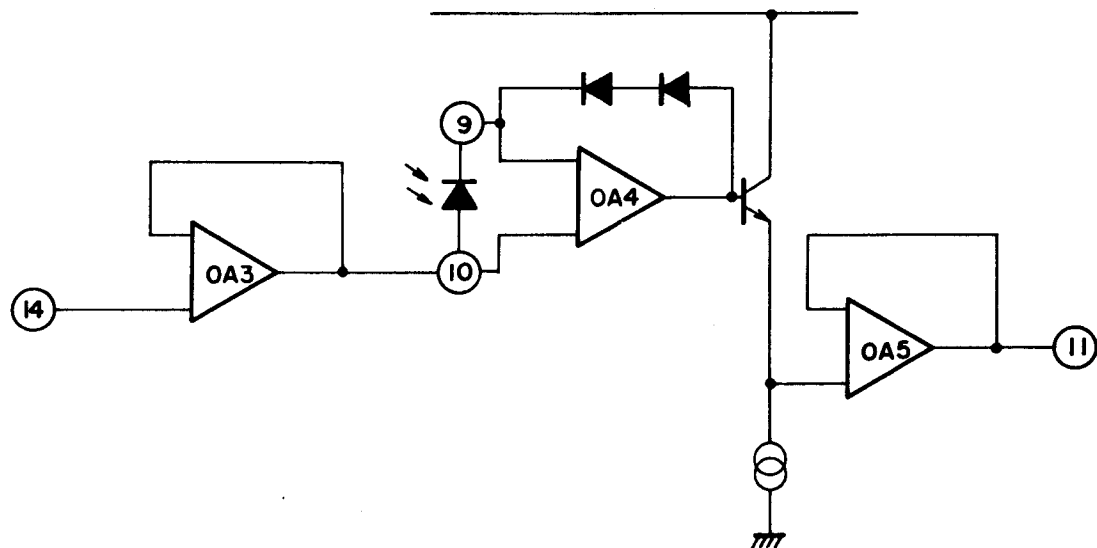
Pin ⑦: Reference voltage, approx. 120mV

Pin ⑭: Information resistor voltage, approx. 250 - 820mV (BLSW OFF)
The voltage of VARIABLE RESISTOR VR1 varies the information resistor voltage.

AMPLIFIER OA3 is a level shift amplifier and it provides output voltage of approx. 50mV lower than that of Pin ⑭ with Pin ⑩ as a reference voltage of the metering amplifier.

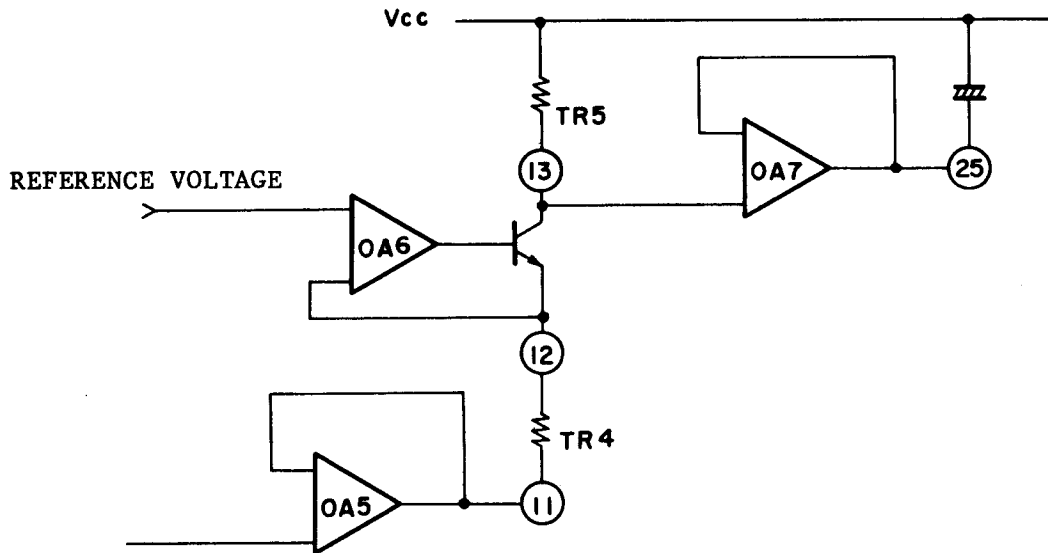


5. Metering



SPD generates current flow in response to the light intensity. The amount of the current flow are converted into the level of voltage through the logarithmic complesion; the output of COMPARATOR OA4 shifts by 36mV/LV. The output of COMPARATOR OA4 is connected with the transistor and is provided with AMPLIFIER OA5. AMPLIFIER OA5 operates as a voltage follower and the output voltage of Pin (11) is equal to that of COMPARATOR OA4.

6. Exposure computation



The output of Pin ⑪ is determined by adding the voltage of metering output to that of information resistor output.

Thus, shutter speed on Auto mode is calculated by the voltage of Pin ⑪, and is converted into the power source reference.

The reference voltage is provided with COMPARATOR OA6.

(The voltage between Pin ⑫ and Pin ⑪) = (the voltage between Vcc and Pin ⑬)

The voltage between Vcc and Pin ⑬ corresponds to the shutter speed and the higher shutter speed will decrease the voltage.

The voltage of Pin ⑪ : Approx. 760mV (Central value at 1/30 sec.)

The voltage of Pin ⑫ : Approx. 1200mV

The voltage of Pin ⑬ : Approx. 460mV (Central value at 1/30 sec.)

AMPLIFIER OA7 is a memory amplifier to memorize the calculated voltage into MEMORY CONDENSER.

Thus output voltage of Pin ⑬ is equal to that of Pin ⑵.

7. Meter

MANUAL VOLTAGE CIRCUIT of the reference voltage circuit is utilized to generate the reference voltage of meter.

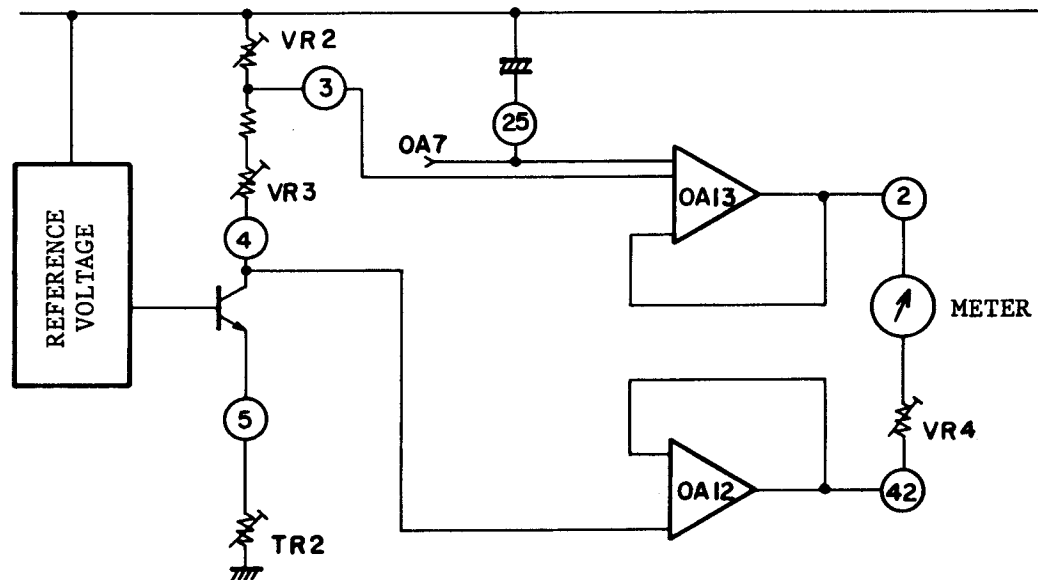
That is the voltage of Vcc reference.

VARIABLE RESISTOR VR3 is a level shift adjusting resistor of meter.

The memory voltage of the computation output is provided with COMPARATOR OA13 against the reference of meter.

COMPARATORS OA12 and OA13 are utilized for voltage follower and the level shift circuits of each comparator shift the input voltage by approx. 1V to generate the output voltages (Vcc reference).

The meter is connected with VARIABLE RESISTOR VR4 directly and the output voltages of COMPARATORS OA12 and OA13 are provided with each terminal of meter and VR4.



The output voltage of COMPARATOR OA12 is constant voltage and that of COMPARATOR OA13 shifts by 36mV/EV.

Thus, the meter will operate at the same shifting rate.

The other voltage is inputted from Pin 3 (the voltage at 1/2000 sec. on Manual mode) to COMPARATOR OA13.

Thus, when the voltage at higher shutter speed than 1/2000 sec. is inputted into COMPARATOR OA13, the output voltage of OA13 is limited to be around 1/2000 sec.

The voltage of Pin ④ (from Vcc) : Approx. 700mV (changed by meter shift)

The voltage of Pin ③ (from Vcc) : Approx. 250mV (changed by VR2)

The voltage of Pin ② (from Vcc) : Approx. 1.5V (central value at 1/30 sec.)

The voltage of Pin ④② (from Vcc) : Approx. 1.7V (changed by meter shift)

The voltage between Pin ② and Pin ④② : Approx. 200mV

When FCSW is held off on Auto mode, the meter needle moves to indicate C90; the output voltage of COMPARATOR OA13 goes up to approx. 0.6V. For battery checking, the output voltage of OA13 goes down to GND to cancel the meter needle movement.

8. Shutter speed control on Auto mode

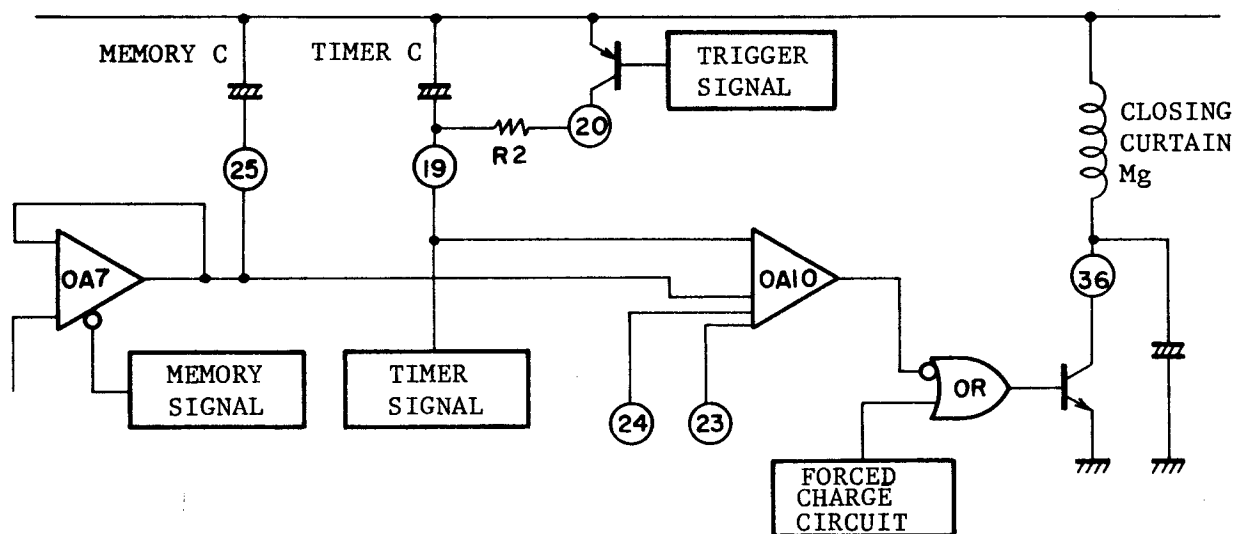
Shutter release turns MSW off before mirror rising and MEMORY SIGNAL goes high. Then AMPLIFIER OA7 turns off to store the voltage of the computation output at MEMORY C.

At the same time, TRIGGER SIGNAL turns low to turn the transistor of Pin ②① on and TIMER C is discharged.

COMPARATOR OA10 is a shutter speed control comparator and Auto input, Manual input and Sync input are provided to select the input according to the mode setting.

When the TIMER C is discharged, the voltage of TIMER C is higher than that of MEMORY C and thus the output voltage of COMPARATOR OA10 goes low. This signal is reversed and inputted into OR CIRCUIT.

Then the output voltage of OR CIRCUIT goes high to turn the transistor on and the closing curtain magnet is charged.



Closing curtain Mg charging current = $3(V) \div 310 (\Omega) = 10 \text{ (mA)}$

The current consumption is approx. 13mA (3mA for METRING + 10mA for CLOSING CURATING MG)

One input terminal of OR CIRCUIT is connected with FORCED CHARGE CIRCUIT. When the voltage of MEMORY C is higher than that of TIMER C, the output voltage of COMPATOR OA10 will turn high. Thus CLOSING CURTAIN MG is charged for the duration from MSW OFF until TSW OFF forcedly by FORCED CHARGE CIRCUIT (refer to TIMING CHART).

The mirror rises to taking position and the opening curtain starts to travel. Turning TSW off makes TRIGGER SIGNAL high and the transistor of Pin ②① turns off.

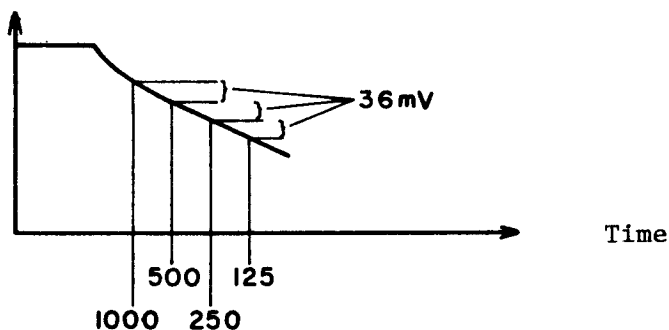
The charge current flows to TIMER CIRCUIT through TIMER C.

The voltage of Pin ①⑨ starts to decrease and crosses to the voltage of MEMORY C. At the moment, COMPARATOR OA10 reverses and the output becomes low. The transistor turns off and the closing curtain starts to travel. The voltage of Pin ①⑨ decreases by 36mV if the shutter speed slows down twice as much.

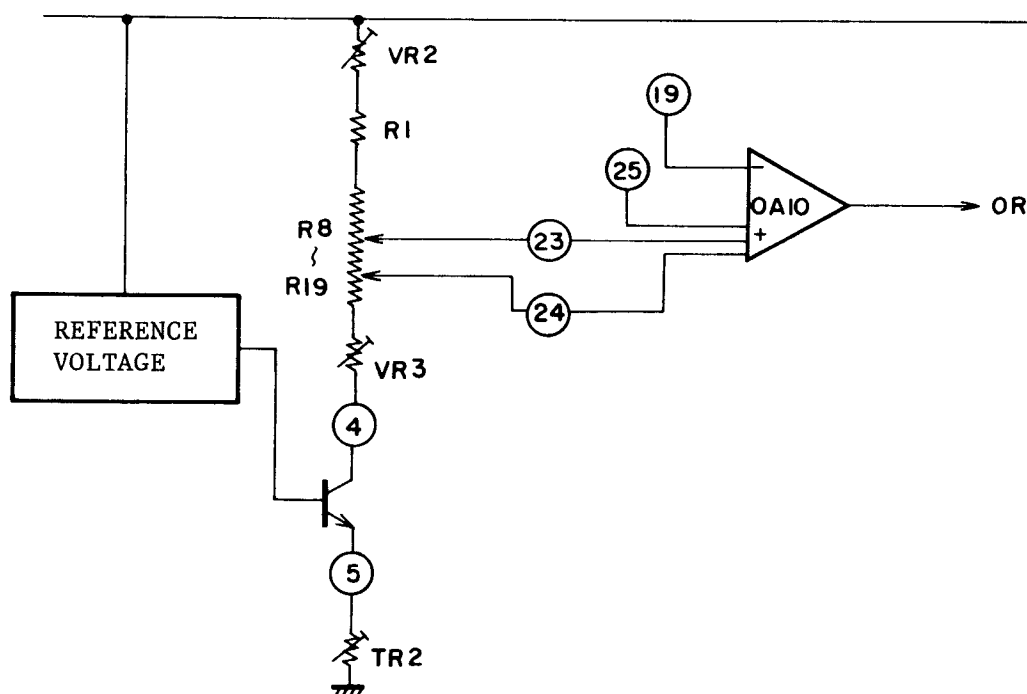
Ex.: The voltage of Pin ①⑨

The voltage at 1/1000 sec. - that at 1/500 sec. = 36mV

Voltage



9. Shutter speed control on Manual mode



On Manual mode, the input of COMPARATOR OA10 is provided by the voltage of Pin ②③ (MANUAL VOLTAGE).

MANUAL VOLTAGE is set according to Vcc reference, and it is adjusted by RESISTOR TR2 to shift by 36mV/EV per one shutter speed.

RESISTOR TR2 is Manual γ adjusting resistor and supplies current flow of approx. 40 μ A to the manual resistor.

On Manual mode, the voltage of Pin ②③ is compared with that of Pin ①① at COMPARATOR OA10.

The voltage of Pin ⑤: Approx. 540mV

The voltage of Pin ②③: Approx. 460mV (from Vcc)

10. Shutter speed control on Speedlight mode

Turning the power switch of the speedlight(the SB-19 etc.) on supplies current flow to the camera.

The output of COMPARATOR OA10 sets the input of Pin ②④.

Pin ②④ is the output at 1/90 sec. on Manual mode.

On Auto mode, the shutter speed is automatically set to 1/90 sec..

On Manual mode, COMPARATOR OA10 sets the inputs of both Pin ②③ and Pin ②④. The input of Pin ②④ is selected when the shutter dial is set between 1/1000 and 1/125. The input of Pin ②③ is selected when the shutter dial is set at 1/60 or lower.

When FCSW is off on Auto mode, the shutter speed is automatically set to 1/90 sec.

The voltage of
Pin ②④: Approx. 410mV
(from Vcc)

Mode/set speed	Shutter speed delivery
Auto	1/90
Manual 1/1000 - 1/125	1/90
Manual 1/60 - 1	As set

11. Auto/Manual mode detection


Auto/Manual mode detection is executed by Pin 23.

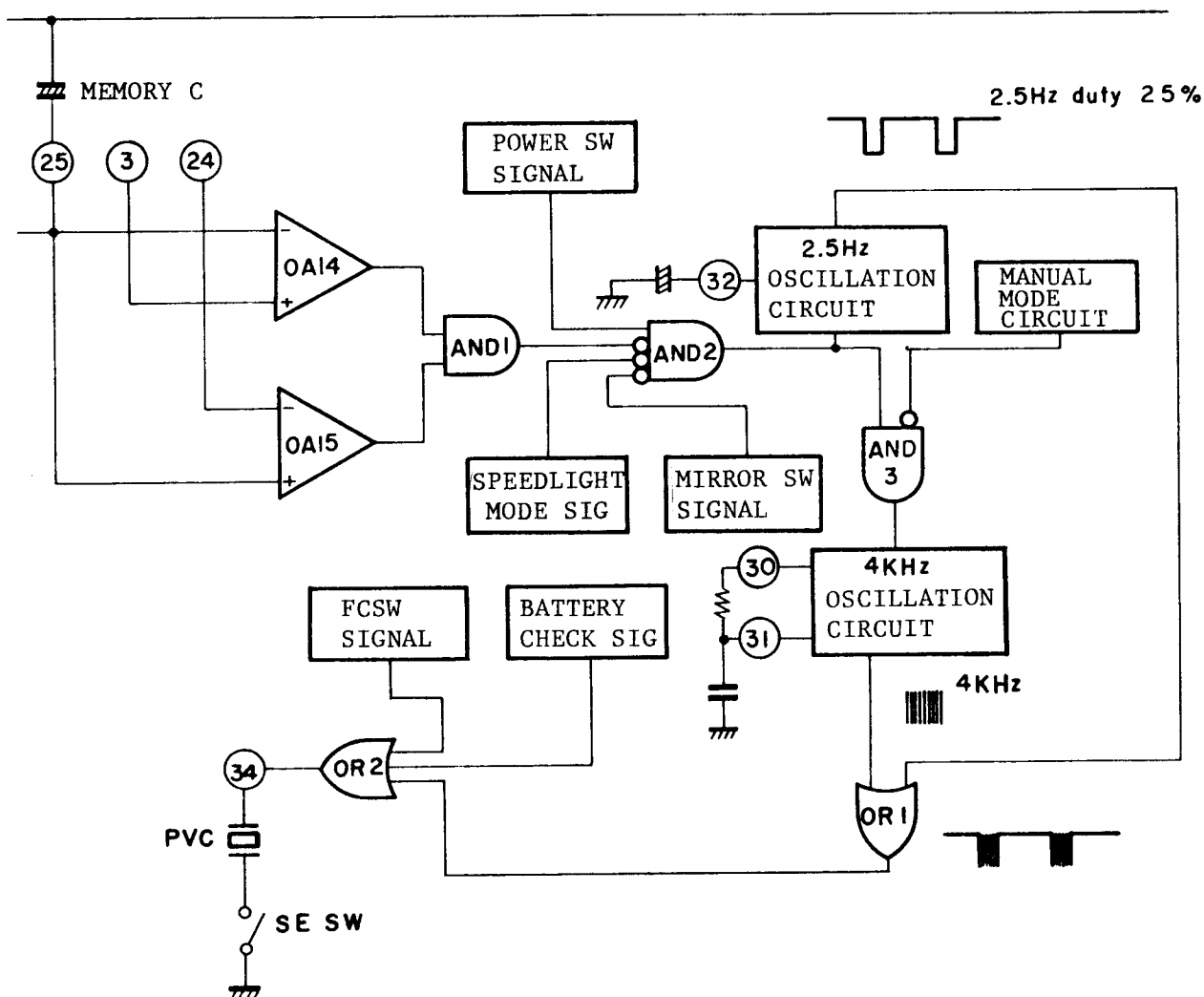
Pin ②③ generates the voltage which is 1V or higher than GND on Manual mode and the voltage varies along the shutter speed.

On Auto mode, the voltage of Pin 23 is equal to GND.

The voltage difference between Manual and Auto modes is detected by Pin (23), and Pin (23) generates MODE SELECTION SIGNAL.

12. Audible warning circuit

Set the shutter dial to  and depress the shutter release button halfway (Power SW ON). The audible warning sounds if the meter needle moves to the overexposure warning zone or the picture blur warning zone.



The sound interval of the audible warning is 2.5Hz DUTY 25% and the sound becomes 4kHz.

The overexposure warning zone is detected by COMPARATOR 0A14.

The voltage of Pin③ (the voltage at 1/2000 sec.) is inputted into the positive (+) input terminal of OA14.

The memory voltage (the computation output voltage) is inputted into the negative (-) input terminal of OA14.

The off set voltage of 36mV is set between the positive and negative input terminals of OA14.

When the negative input voltage becomes higher than the positive input voltage - 36mV, the output of COMPARATOR OA14 is reversed from high to low.

Thus, the reference voltage of the overexposure warning is the voltage at 1/2000 sec. - 36mV; the voltage at 1/1000 sec...

The overexposure warning is activated when the memory voltage becomes higher than the voltage at 1/1000 sec..

The picture blur warning zone is detected by COMPARATOR OA15.

The voltage of Pin ②④ (the voltage at 1/90 sec.) is inputted into the negative input terminal of OA15. The memory voltage (the computation output voltage) is inputted into the positive input terminal of OA15. The off set voltage of 66mV is set between the positive and negative input terminals of OA15.

When the positive input voltage becomes lower than the negative input voltage - 66mV, the output of COMPARATOR OA15 is reversed from high to low. Thus, the reference voltage of the picture blur warning is the voltage at 1/90 sec. - 66mV; the voltage at 1/25sec.

The picture blur warning is activated when the memory voltage becomes lower than the voltage at 1/25 sec..

The output of COMPARATORS OA14 and OA15 are inputted into AND1 CIRCUIT. The output of AND1 CIRCUIT turns low when either COMPARATOR OA14 or COMPARATOR OA15 detects the warning zone.

AND2 CIRCUIT controls 2.5Hz OSCILLATION CIRCUIT for intermittent oscillation of the audible warning.

Turning the output of AND2 CIRCUIT high activates 2.5Hz OSCILLATION CIRCUIT. The outputs of the power switch signal, speedlight mode signal and mirror switch signal are inputted into AND2 CIRCUIT.

Turning the power switch on makes the power switch signal high. Turning the power switch of the speedlight on makes the speedlight mode signal high. Turning the mirror switch off makes the mirror switch signal high. Thus, when the power switch and mirror switch are on, and the speedlight mode signal and the output of AND1 CIRCUIT are low, the output of AND2 CIRCUIT turns high to activate 2.5Hz OSCILLATION CIRCUIT. The output of AND2 CIRCUIT is inputted into AND3 CIRCUIT together with MANUAL MODE CIRCUIT SIGNAL.

AND3 CIRCUIT controls 4kHz OSCILLATION CIRCUIT.

On Auto mode, the output of MANUAL MODE CIRCUIT is held low and 4kHz OSCILLATION CIRCUIT is activated only when 2.5Hz OSCILLATION CIRCUIT is in operation.

OR1 CIRCUIT puts 2.5Hz together 4kHz and inputs the two outputs into OR2 CIRCUIT.

FCSW SIGNAL and BATTERY CHECK SIGNAL are also inputted into OR2 CIRCUIT. Turning FCSW off makes FCSW SIGNAL high and BATTERY CHECK SIGNAL turns high when the voltage becomes lower than the battery check voltage. Thus, OR2 CIRCUIT outputs the voltage only when both FCSW SIGNAL and BATTERY CHECK SIGNAL are held low.

Pin ③④ outputs the composite wave of 2.5Hz and 4kHz. The warning buzzer sounds by 2.5Hz DUTY 25%.

Setting the shutter dial to \blacklozenge turns SILENCER SW on and to A turns it off. Refer to TIMING CHART.

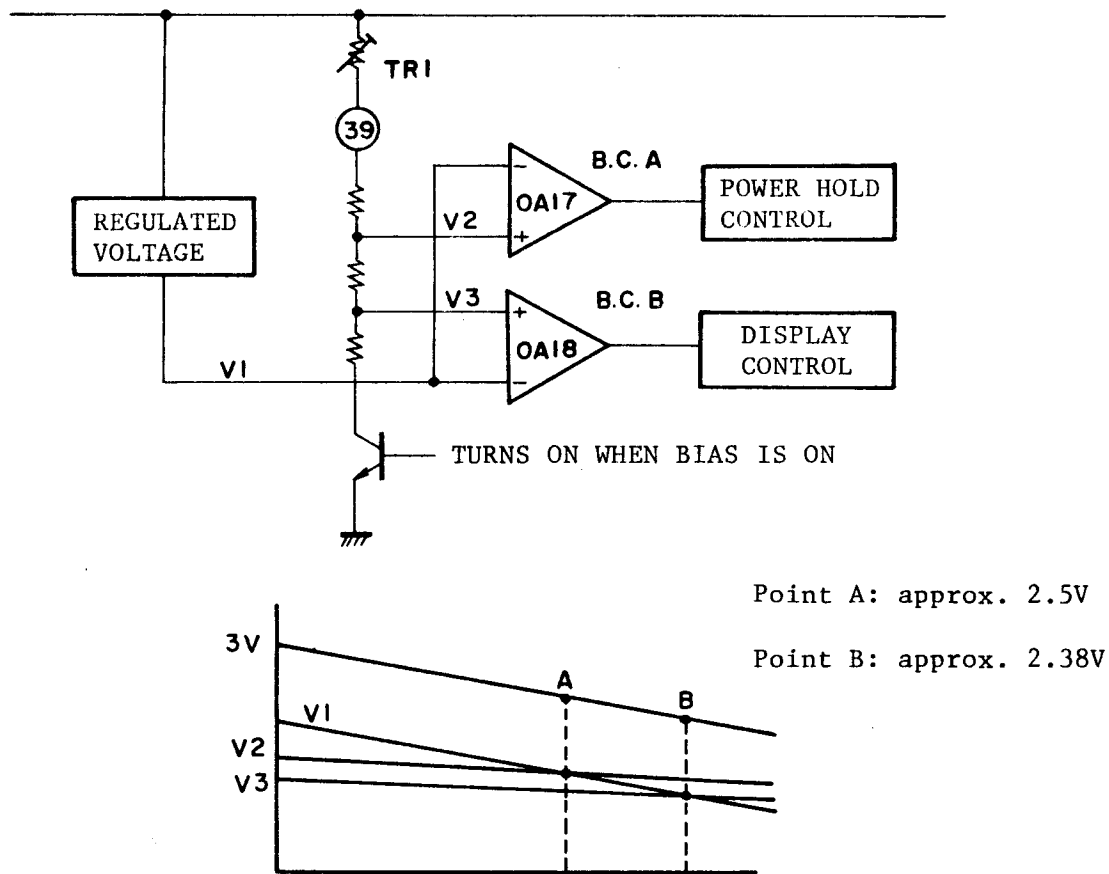
The output of Pin ③④



Approx. 3V

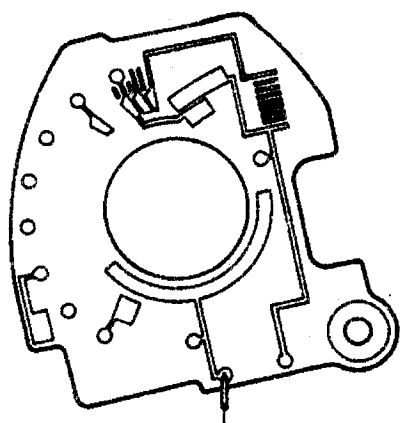
Approx. 0V

13. Battery check circuit

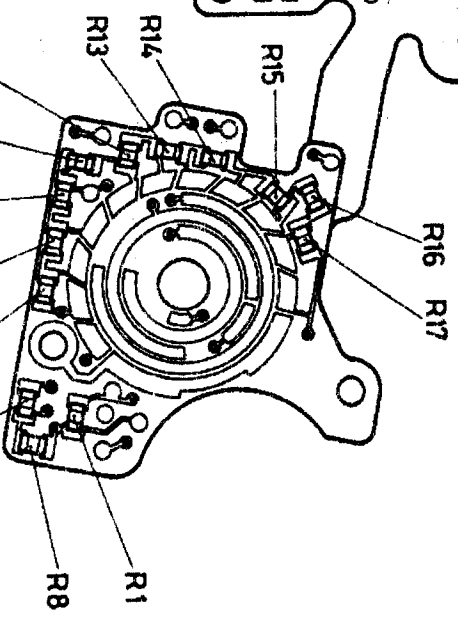


The voltage V1 is higher than the voltages V2 and V3 when the battery voltage is 3V. The outputs of COMPARATORS OA17 and OA18 are low. When the battery voltage goes down to Point A, the voltage V1 is lower than V2, but higher than V3. Then the output of COMPARATOR OA17 (B.C.A) only turns high. The circuit is held on while the shutter release button is depressed halfway; it will be no longer on when finger is removed from the button. Also in this condition, shutter will operate normally. When the voltage goes down to Point B, the voltage V1 is lower than the voltages V2 and V3. The output of COMPARATOR OA18 (B.C.B) also turns high. In this condition, the meter, LEDs and audible warning will not operate, but the shutter release is not locked. RESISTOR TR1 has been made to fit for individual circuitry.

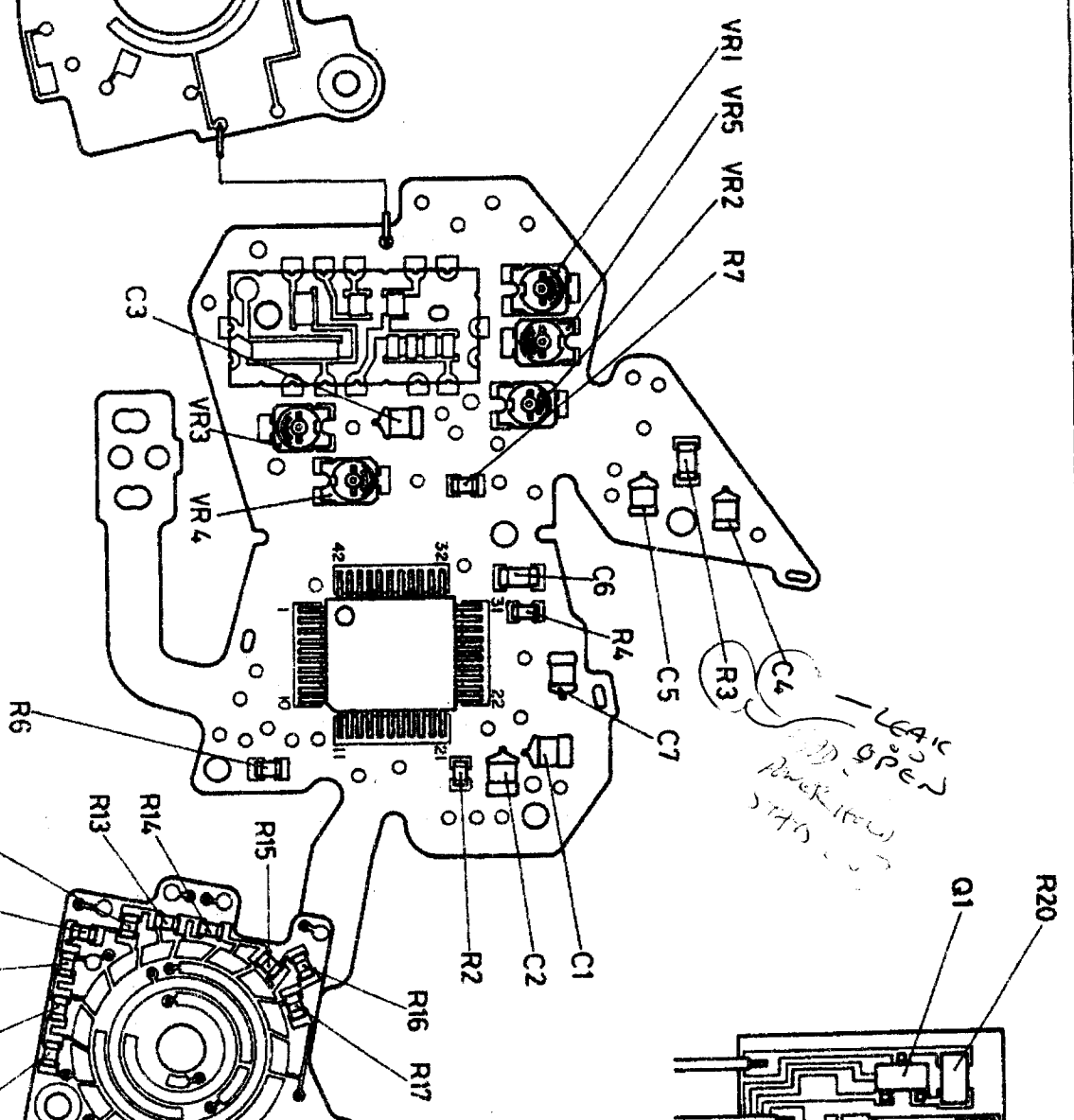
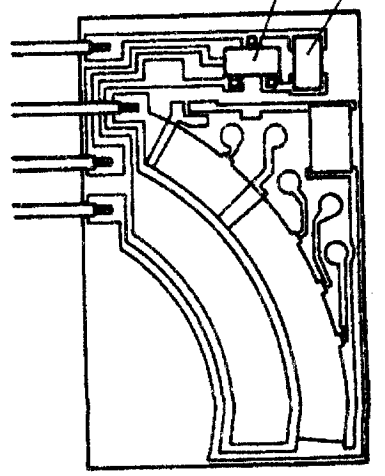
ASA基板
ASA base plate

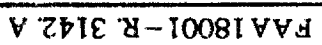


シャッターダイヤル基板
Shutter dial base plate

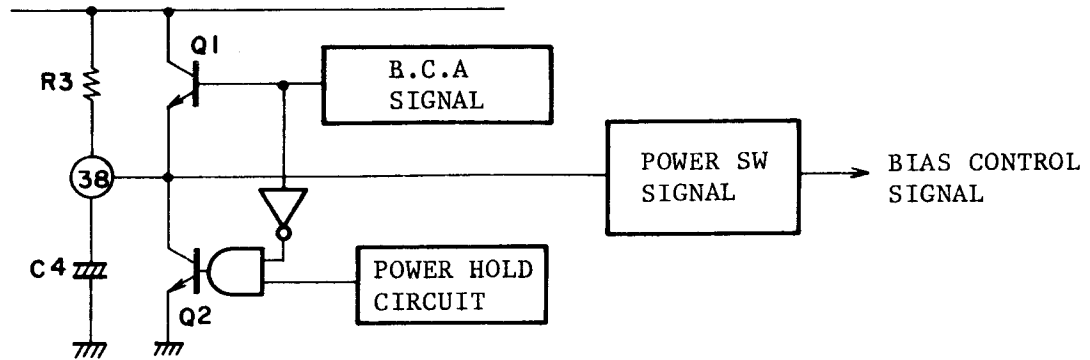


f-f0 基板
f-f0 base plate





14. Power hold circuit



POWER HOLD CIRCUIT is an analog type timer circuit.

Turning POWER SW on makes POWER SW SIGNAL high and BATTERY CHECK (B.C.A) SIGNAL low to turn the transistor of POWER HOLD CIRCUIT on. Then, CONDENSER C4 is discharged.

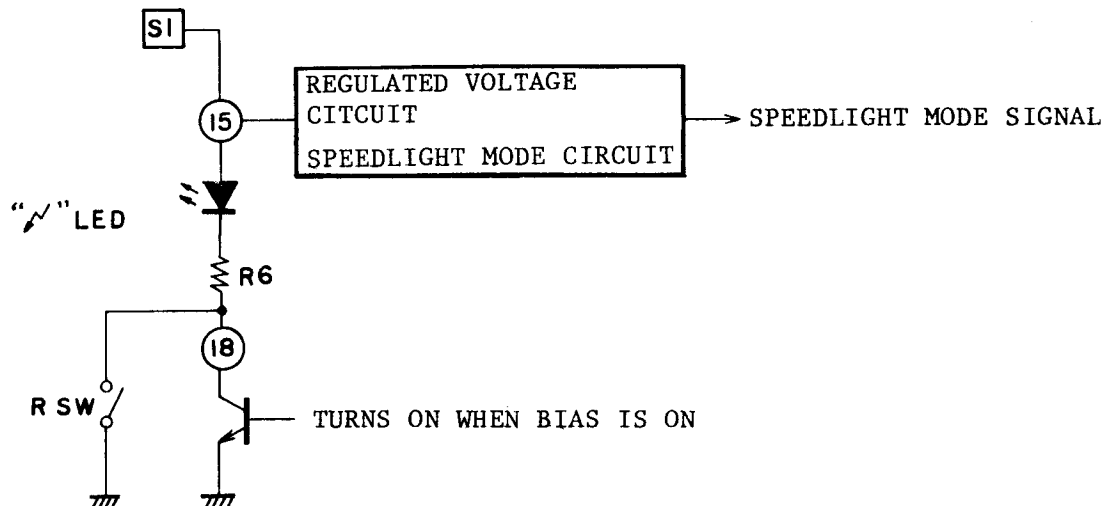
Turning POWER SW off turns TRANSISTOR Q2 off and CONDENSER C4 is charged by RESISTOR R3.

The timing of the power hold is controlled by the input voltage level of POWER HOLD CIRCUIT. Thus, when the charged voltage reaches the level, the power hold will be finished.

BATTERY CHECK (B.C.A) SIGNAL turns high when the battery voltage goes down. TRANSISTOR Q2 turns off and TRANSISTOR Q1 turns on to charge CONDENSER C4. Thus, this condition is equal to the finish of the power hold.

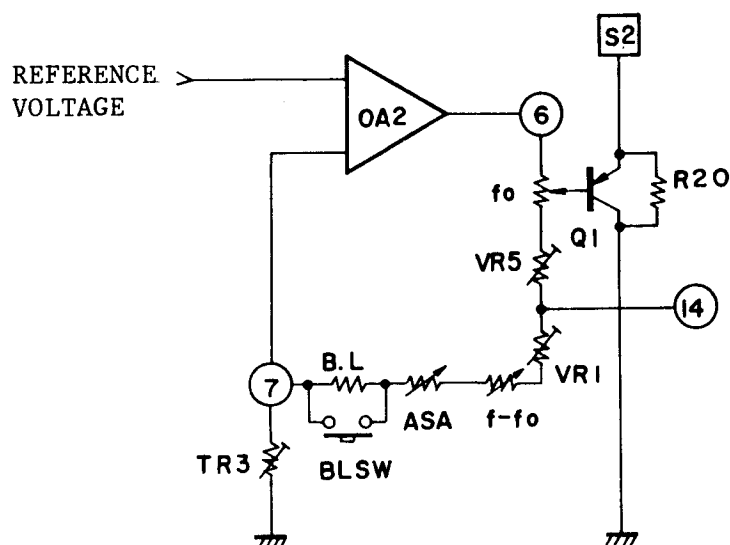
Reference level of Pin 38 : Approx. 1V

15. Ready-light circuit



SPEEDLIGHT MODE CURRENT (approx. $40\mu\text{A}$) flows to Pin (15) when the speedlight attached is switched on and SPEEDLIGHT MODE CIRCUIT is activated. Thus, SPEEDLIGHT MODE SIGNAL turns high. At this time, REGULATED VOLTAGE CIRCUIT is not activated and the voltage of Pin (15) becomes approx. 1.6V. When the speedlight is charged, READY-LIGHT CURRENT (approx. 5mA) flows to Pin (15). REGULATED VOLTAGE CIRCUIT is activated and the voltage of Pin (15) becomes the regulated voltage of approx. 3V. If the level of Pin (18) is low when POWER SW is on or POWER HOLD CIRCUIT is in operation, the current which is controlled by RESISTOR R6 flows to Ready-light LED. Thus, Ready-light LED lights up. When the power hold is finished or the output of COMPARATOR OA18 (B.C.B) is high, Ready-light LED does not light up although the current is supplied. READY-LIGHT SW turns on when setting the shutter speed dial to B or M90. In this condition Ready-light LED is lighted up by only the current flow from the speedlight.

16. Flash output control circuit

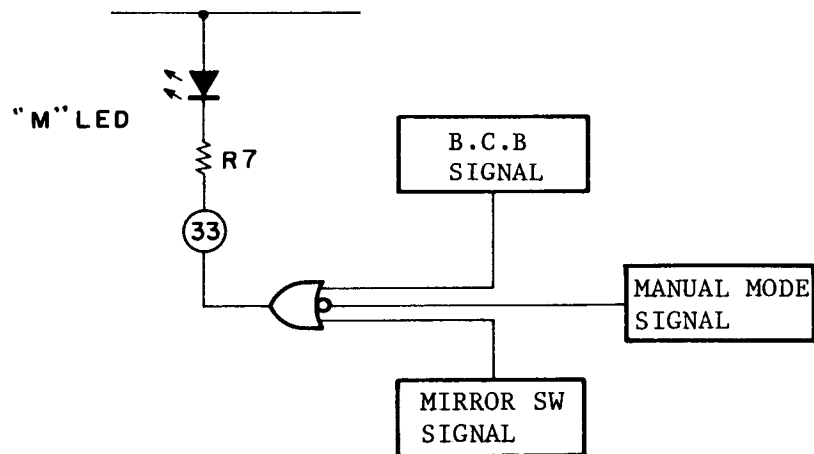


The flash output level of the SB-19 or SB-E is controlled according to the ASA film speed and aperture settings. In order to inform the speedlight of the aperture value, Lens speed information is required. Lens speed information resistor is also connected with other information resistors directly and it will shift by 36mV/AV . When the regulated current ($20\mu\text{A}$) of the speedlight is supplied to TERMINAL S2 (Contact for the SB-19 or SB-E), the voltage of the information resistor is added to the forward direction voltage of TRANSISTOR Q1 and the voltage is transmitted to the speedlight. VARIABLE RESISTOR VR5 is the f_0 level shift adjusting resistor.

The voltage of TERMINAL S2: 1317mV (central value)

ASA 100, F5.6 (50mm F1.8 lens)

17. Manual mode indication LED



On Manual mode, the red LED "M" lights up.
 When MIRROR SW is off or BATTERY CHECK (B.C.B) SIGNAL is high,
 the red LED "M" is turned off.

The voltage of Pin 33 : Approx. 0V (LED lights)

18. Mirror switch, Trigger switch

The voltage of Pin 28 : 0V (MIRROR SW ON)

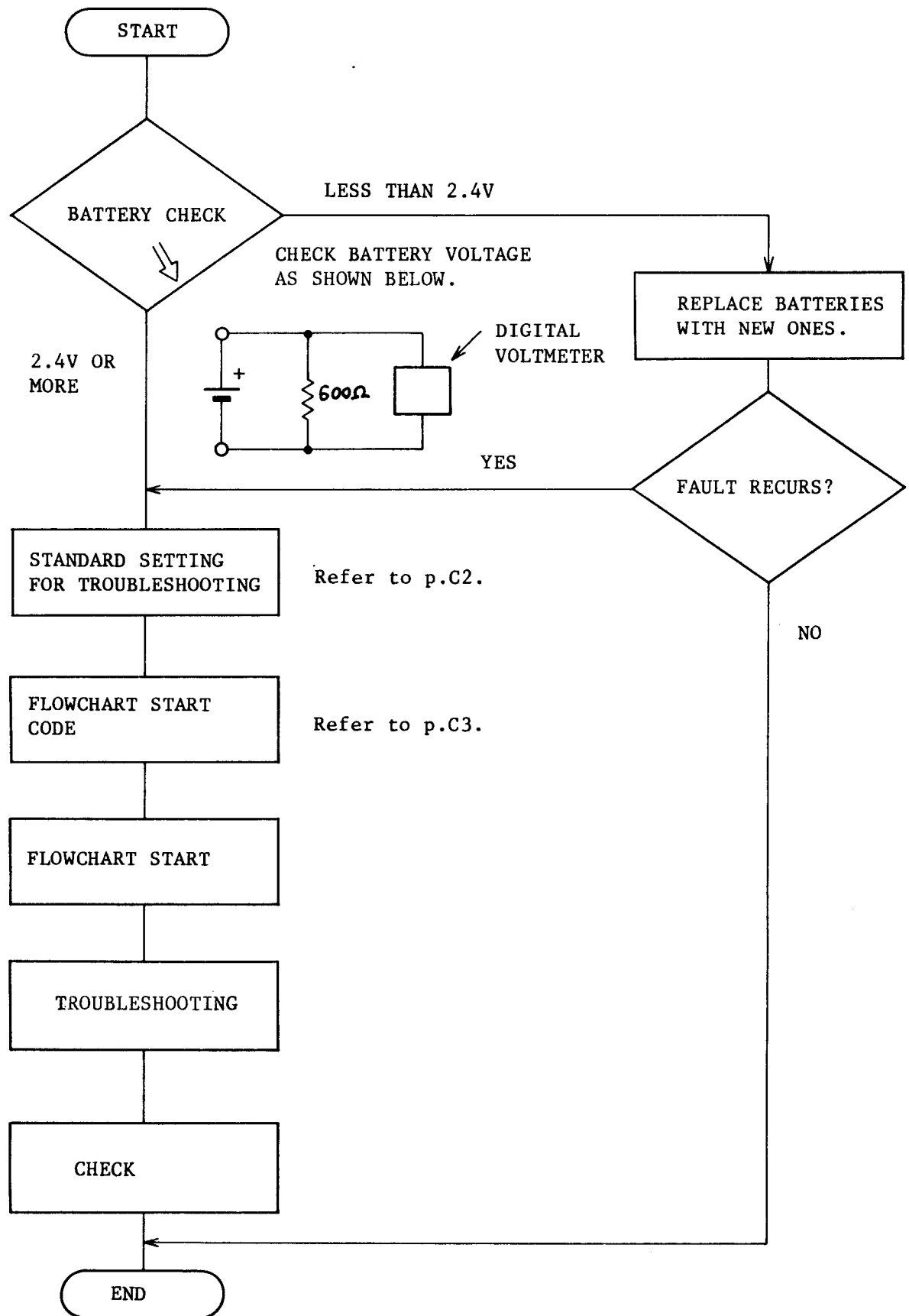
Approx. 0.6V (MIRROR SW OFF)

The voltage of Pin 22 : 0V (TRIGGER SW ON)

Approx. 1V (TRIGGER SW OFF)

TROUBLESHOOTING FLOWCHART

Troubleshooting procedure



Precautions

1) Standard setting for troubleshooting

Shutter dial	1/30	f/stop	F4
ASA dial	100	Brightness value	LV9
Frame counter	1 or more	Shutter release button	Depressed halfway
Film-advance lever	Condition after film-advancing	Exposure compensation button	Not to be depressed

2) Switches

Name	Function	Location
Frame counter sw (FCSW)	To release shutter at 1/90 sec. before frame counter reaches 1 on Auto mode	Film-advance base unit
Power sw (HSW)	Metering, Audible warning, Power hold	Shutter release button
Mirror sw (MSW)	To charge magnet, memorize metering and hold meter	Front plate
Trigger sw (TSW)	Time generating	Shutter
Sync sw	To fire flash (X contact)	Shutter
Closing curtain sw	To make motor drive advance the film	Shutter
MD sw	To make motor drive advance the film	MD coupling
Exposure compensation sw (B.L. SW)	To compensate exposure	ASA base plate

3) Abbreviations

TA	Shutter speeds delivery on Auto mode *1	M	Main FPC *2
TM	Shutter speeds delivery on Manual mode *1	T	Shutter dial base plate *2
IA	Current flow of power source on Auto mode	A	ASA base plate *2
IM	Current flow of power source on Manual mode	Highest critical speed	Shutter speeds delivery is faultily high-speed

*1: Shutter tester should be used for measurement.

*2: Ex. M ② : CHECK LAND ② of Main FPC

T ② : CHECK LAND ② of Shutter dial base plate

A ② : CHECK LAND ② of ASA base plate

Refer check lands to p.E6 - E7.

Troubleshooting start code

Check or measure the following items respectively in accordance with the chart below.

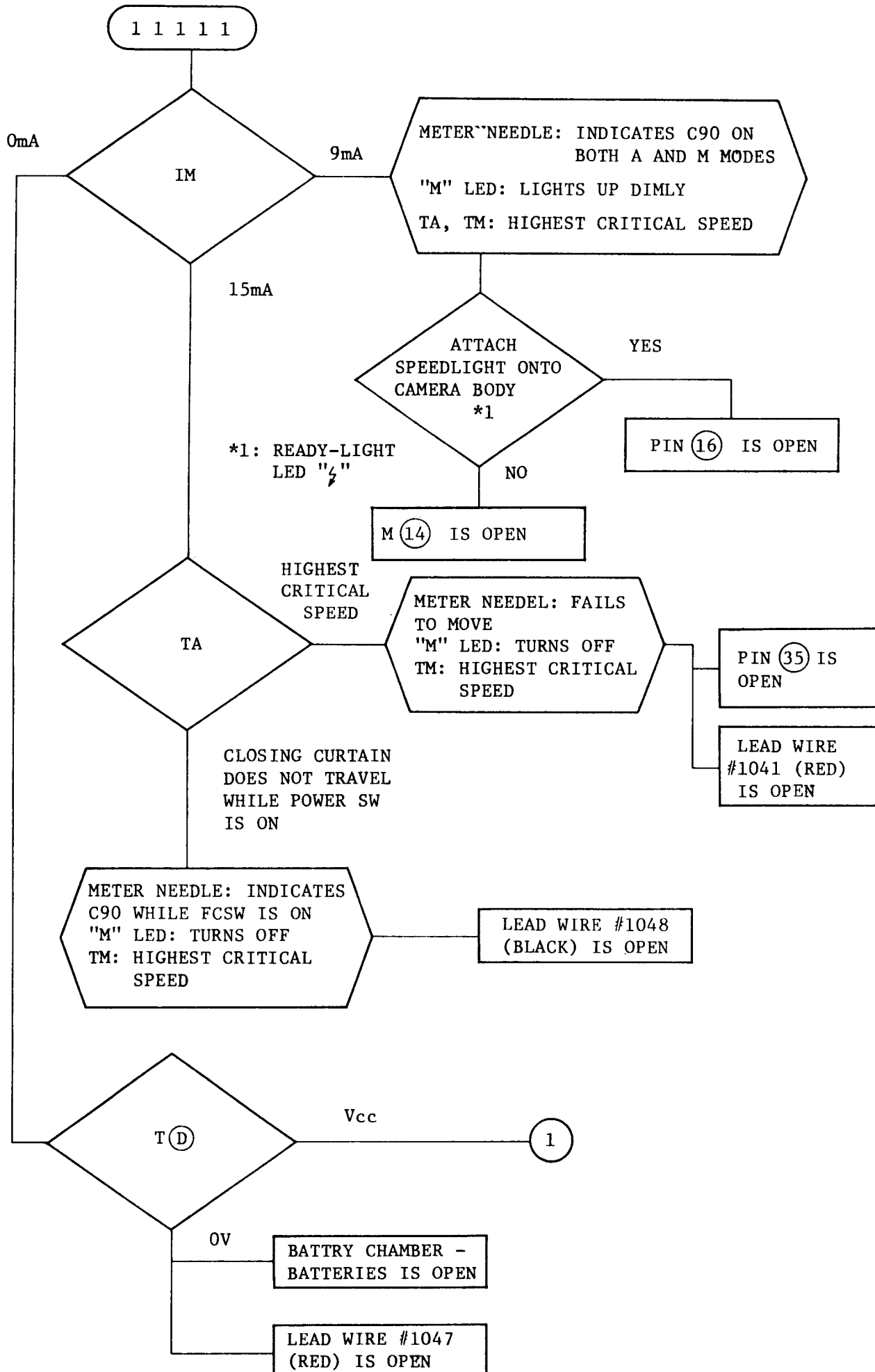
Setting: Standard setting

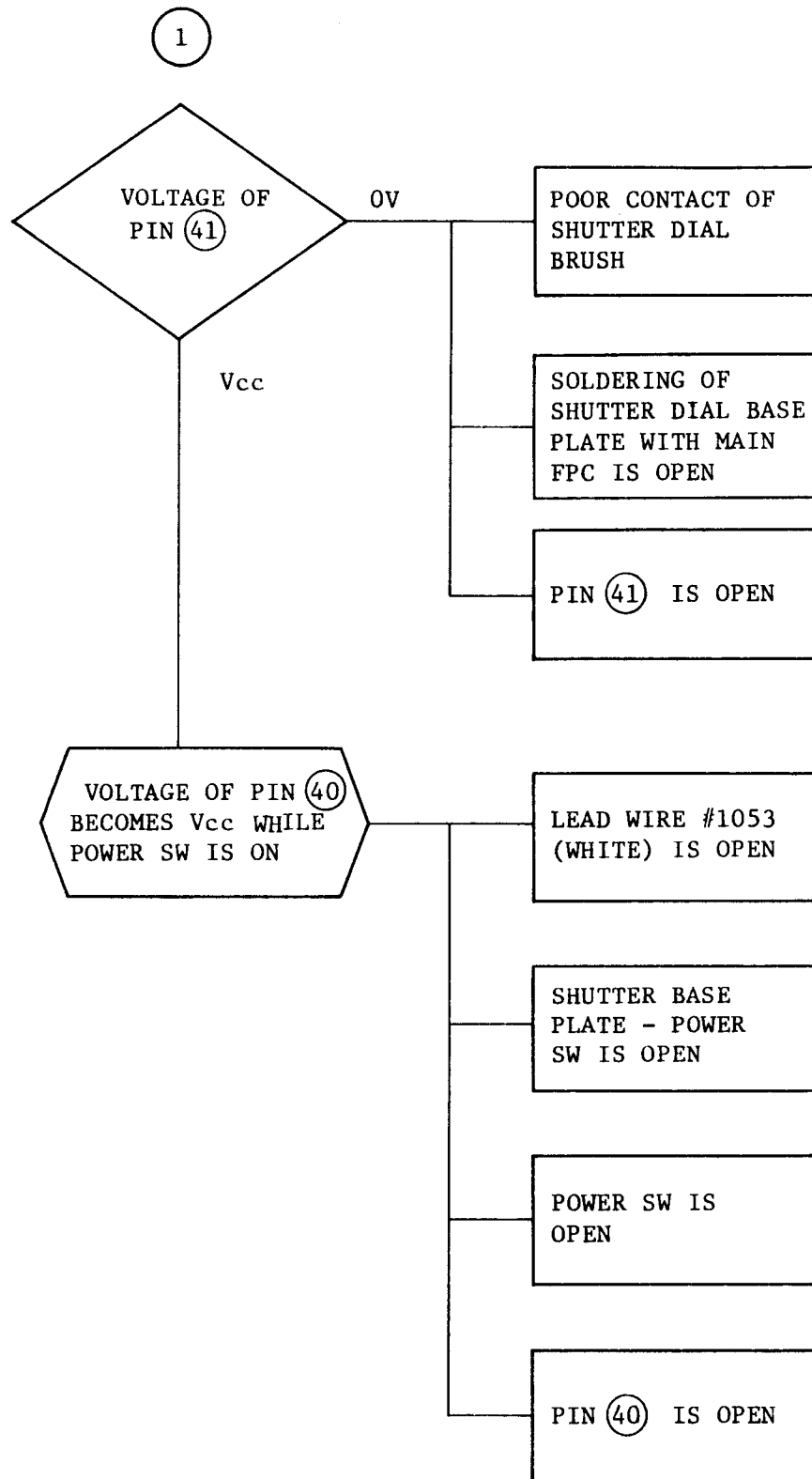
Item	Measurement/check	Normal condition
IM	Measure current flow of power source when depressing shutter release button halfway	Approx. 4mA
Meter needle	Check if meter needle positions correctly.	1/30
"M" LED	Check if Manual mode indication LED "M" lights up on Manual mode.	Lighting
TM	Release shutter to measure shutter speed on Manual mode	1/30 sec.
TA	Release shutter to measure shutter speed on Auto mode	1/30 sec.

To make Flowchart start codes, put "0" (when the item is normal) or "1" (when the item is abnormal) to the place specified below respectively.

TM	METER NEEDLE	"M" LED	TM	TA
----	--------------	---------	----	----

Ex.: When all items are abnormal, the flowchart start code becomes "11111".





1 1 1 0 1

IM, IA: AFTER FILM-ADVANCING 15mA
AFTER SHUTTER RELEASING 3 - 4mA
METER NEEDLE: METER NEEDLE INDICATION FAILS
TO CHANGE
(WHEN METER NEEDLE INDICATES C90
ON A MODE, TURNING FCSW ON OR
CHANGING EXPOSURE MODE TO MANUAL
MAKES METER NEEDLE INDICATE
HIGHEST CRITICAL SPEED.)
"M" LED: TURNS OFF
TA: SHUTTER SPEED INDICATED BY METER NEEDLE

LEAD WIRE #1061
(PURPLE) IS OPEN

POOR CONTACT OF
MIRROR SW

PIN (28) IS OPEN

1 1 0 1 1

IM

9mA

"M" LED: LIGHTS UP DIMLY ON
BOTH A AND M MODES

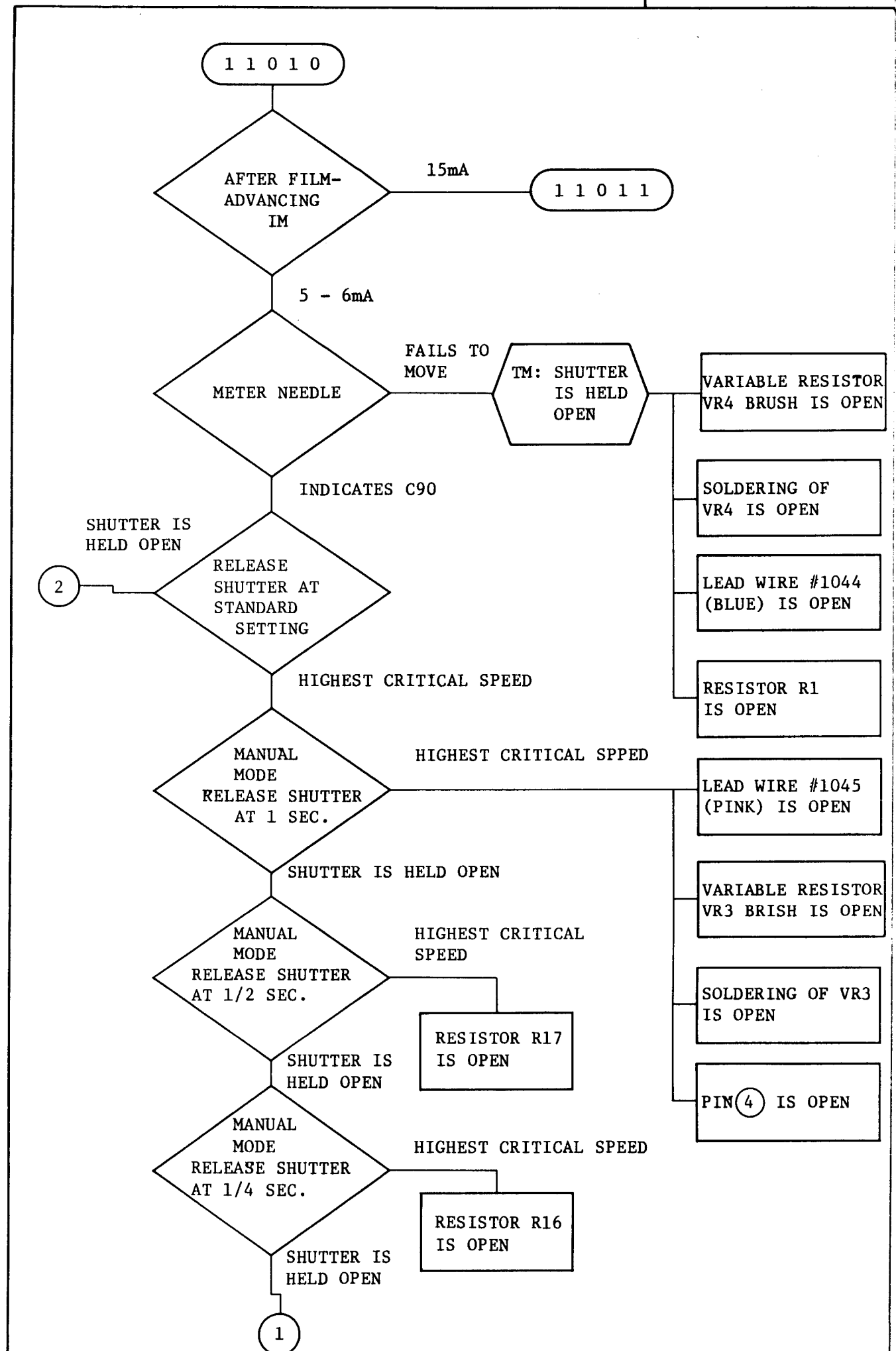
15mA

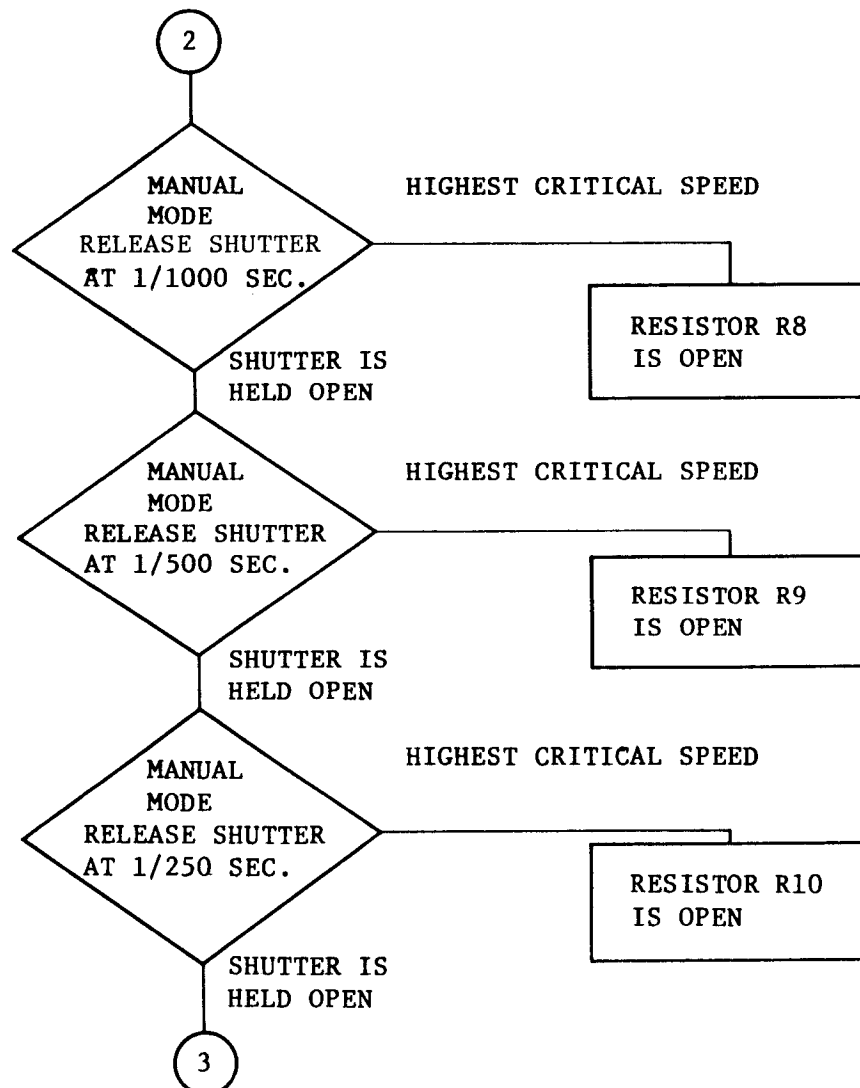
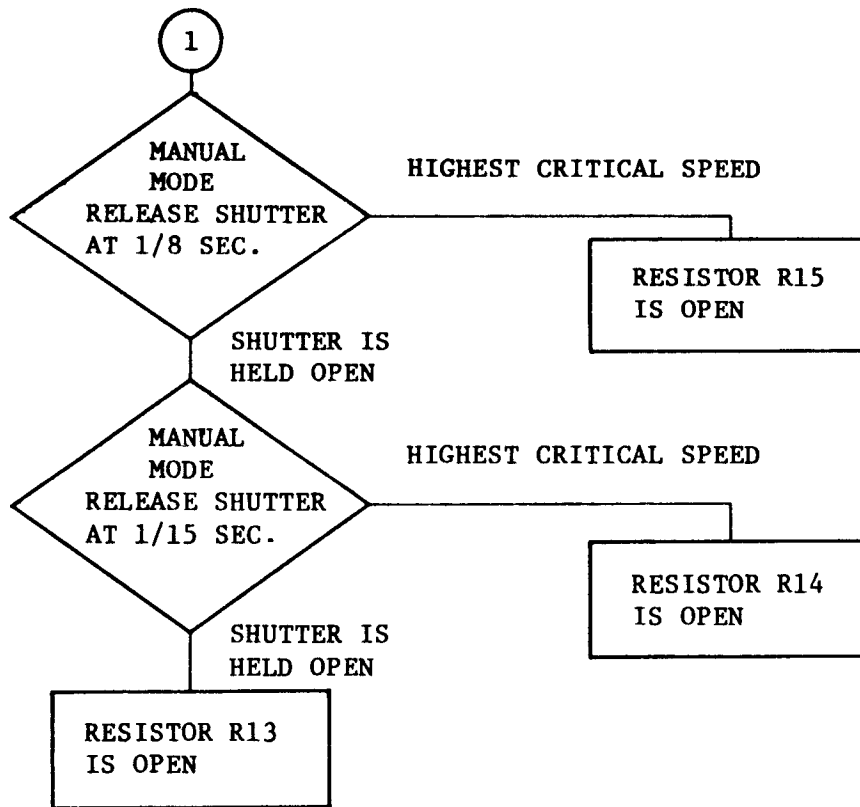
1 1 1 1 1

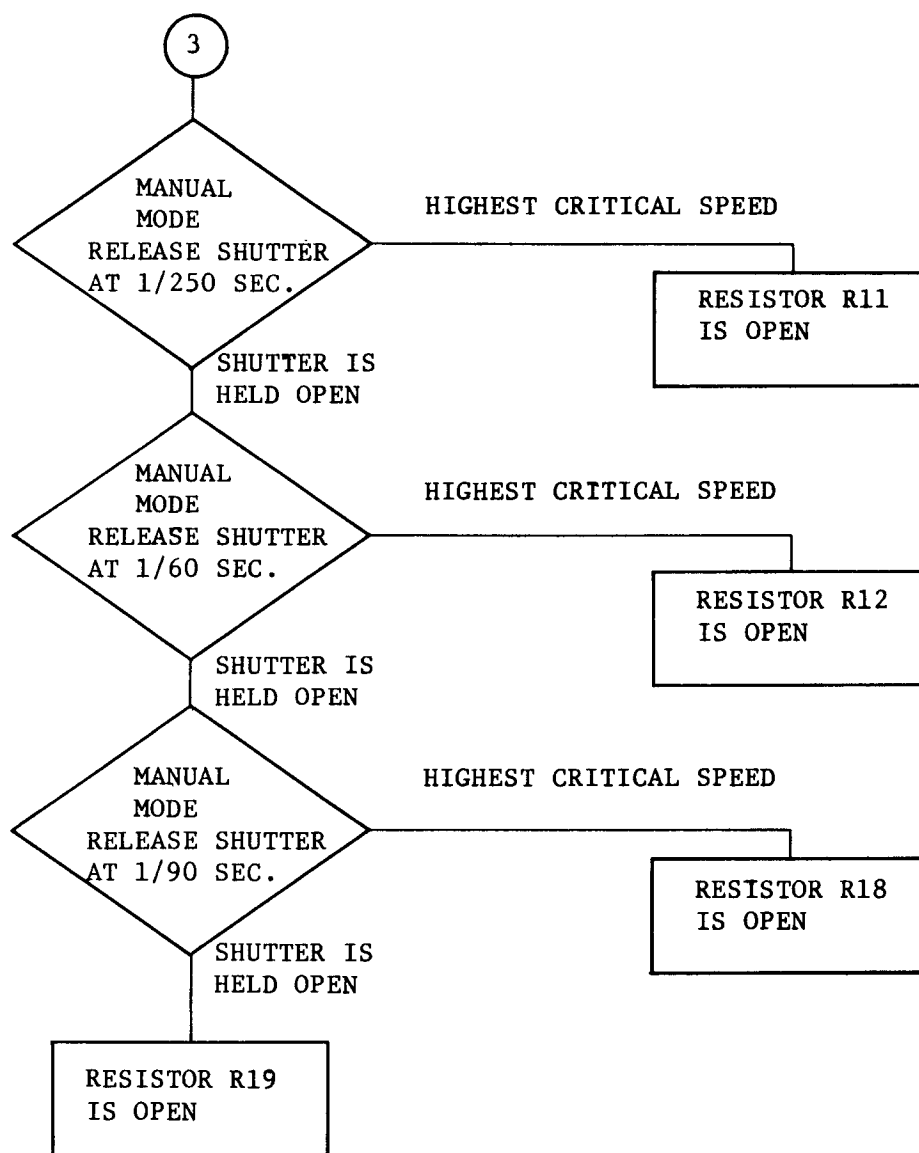
IM: AFTER FILM-ADVANCING 15mA
AFTER SHUTTER RELEASING 4mA
METER NEEDLE: INDICATES CORRECT
SHUTTER SPEED ON A MODE
WHEN FCSW IS OFF
(DOES NOT MOVE IN OTHER
CONDITIONS)
TM: HIGHEST CRITICAL SPEED
TA: OPERATES NORMALLY ONCE AFTER POWER SW
IS ON, AND THEREAFTER DOES NOT CHANGE
REGARDLESS SETTINGS.

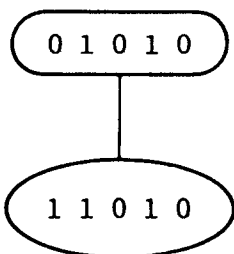
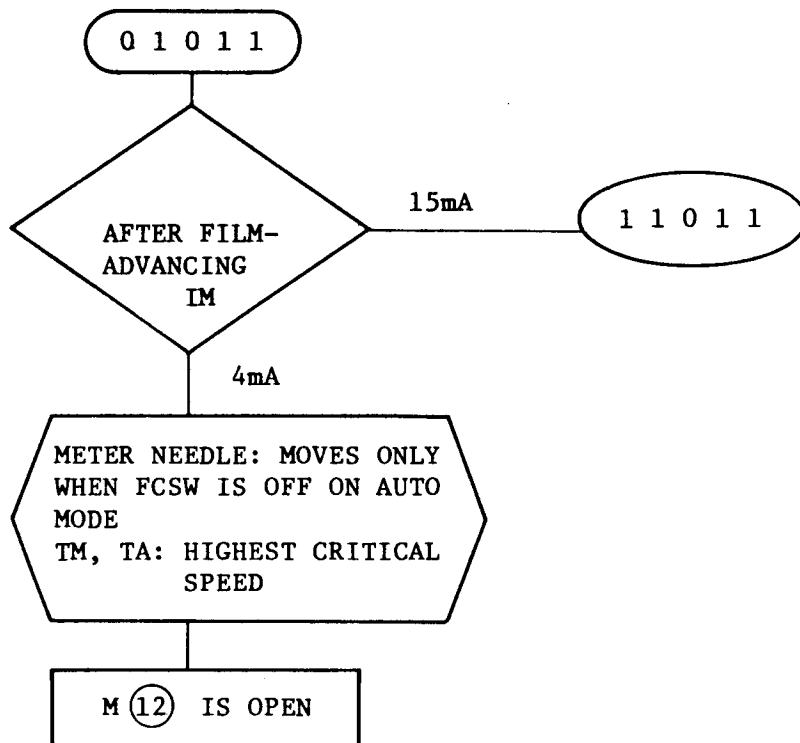
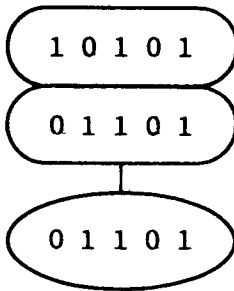
PIN (5) IS OPEN

M (8) IS OPEN









0 1 0 0 1

METER NEEDLE

MOVES UP TO THE LIMIT

TA: HIGHEST CRITICAL
SPEED

INDICATES 1/30

0.12V

0V

VOLTAGE OF
PIN 7

LEAD WIRE
#1066 (PINK)
IS OPEN

LEAD WIRE
#1067
(PURPLE) IS
OPEN

f-fo BRUSH
IS OPEN

ASA BRUSH
IS OPEN

LEAD WIRE
#1049
(YELLOW)
IS OPEN

$M^{(3)}$ IS OPEN

UNSTABLE

M(9) IS OPEN

VOLTAGE OF
PIN 10

0.4 -
0.5V

PIN (11) IS OPEN

PIN (12) IS OPEN

M(6) IS OPEN

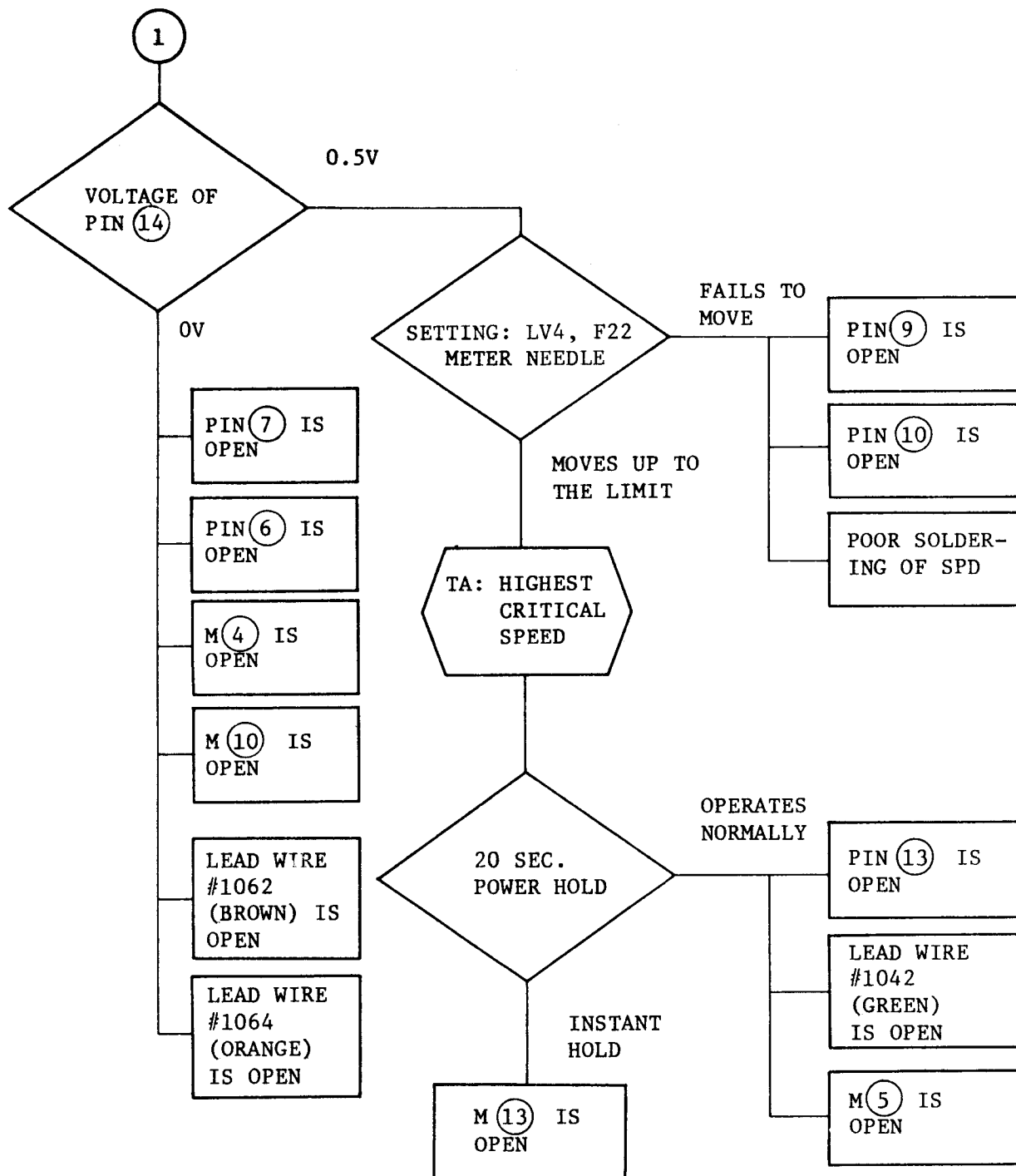
$M^{(7)}$ IS OPEN

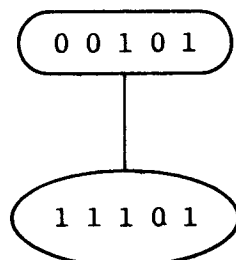
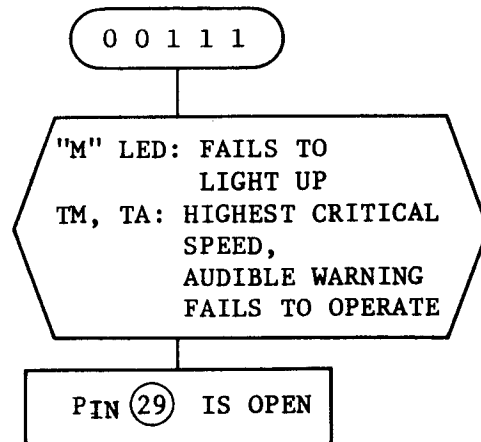
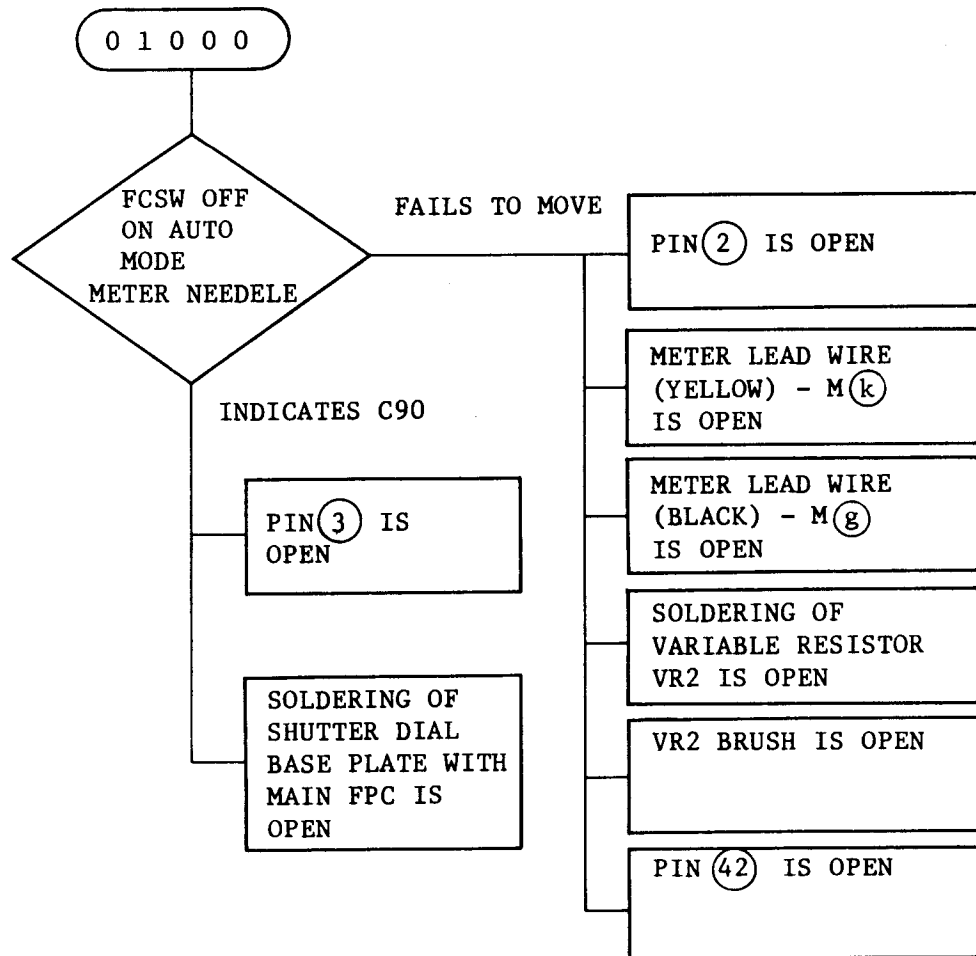
2.2V

PIN (14) IS OPEN

LEAD WIRE #1043
(BROWN) IS OPEN

1





0 0 1 0 0

"M" LED: FAILS TO
LIGHT UP

"M" LED - M (b) IS OPEN

"M" LED - M (c) IS OPEN

SHORT-CIRCUIT OF "M" LED

"M" LED - "M" LED LEAD WIRE (GREEN) IS OPEN

"M" LED - "M" LED LEAD WIRE (RED) IS OPEN

PIN (33) IS OPEN

RESISTOR R7 IS OPEN

0 0 0 1 1

TM

HIGHEST CRITICAL SPEED

SHUTTER IS
HELD OPEN

PIN (23) IS OPEN
OPEN

SOLDERING OF
SHUTTER DIAL
BASE PLATE
WITH MAIN FPC
IS OPEN

BRUSH OF
T (4) - (T (6) -
T (7)) IS OPEN

PIN (19) IS
OPEN

PIN (20) IS
OPEN

CONDENSER
C5 IS OPEN

RESISTOR R2
IS OPEN

AFTER FILM-
ADVANCING
VOLTAGE OF
PIN (22)

UNCERTAIN

PIN (22) IS OPEN

LEAD WIRE #1054
(BLUE) IS OPEN

0V

MIRROR RELEASE

1s

SET SHUTTER
DIAL TO 1.
VOLTAGE OF
PIN (36)

MIRROR RELEASE

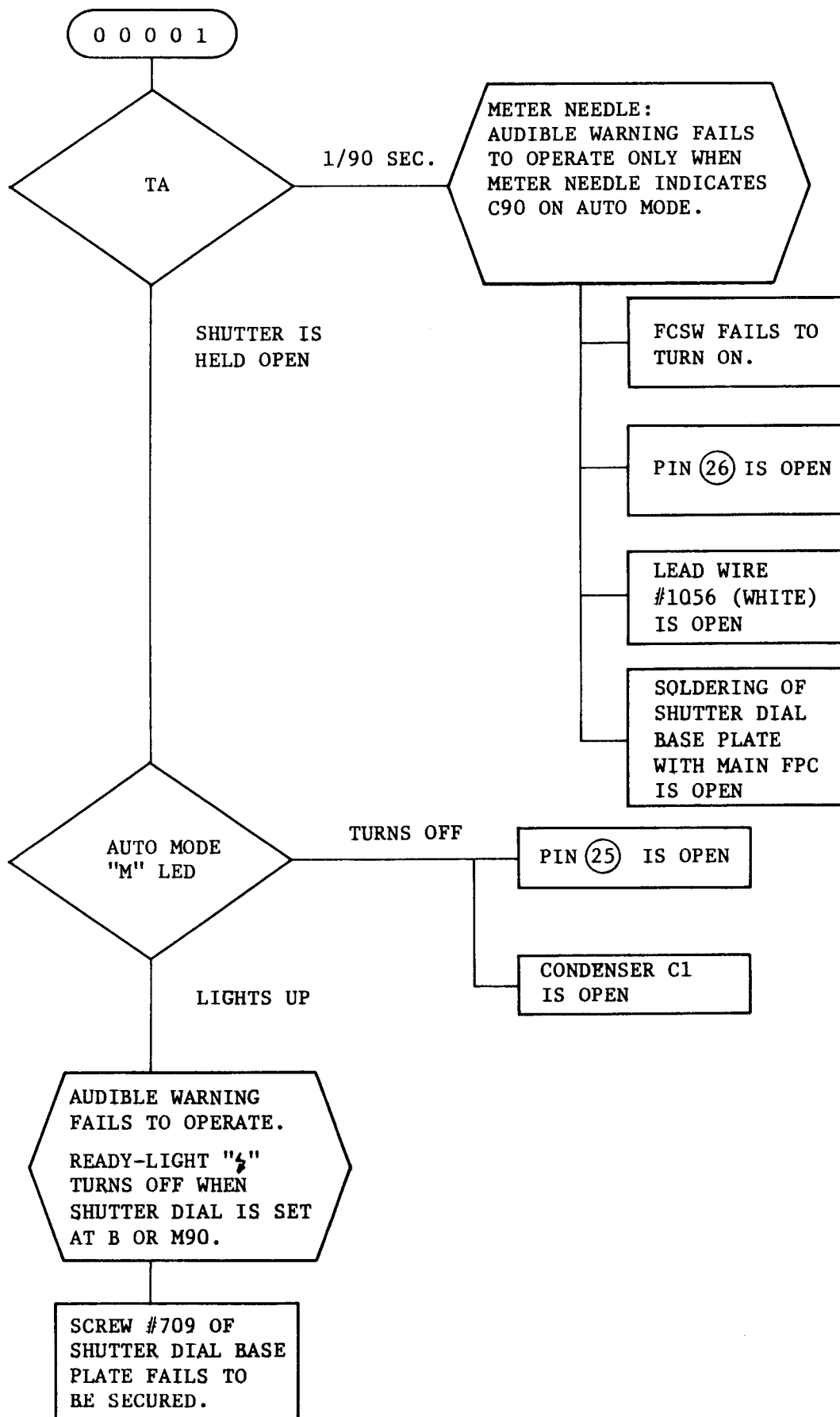
30ms

PIN (36) IS
OPEN

LEAD WIRE
#1052
(YELLOW) IS
OPEN

LEAD WIRE
#1051 (RED)
IS OPEN

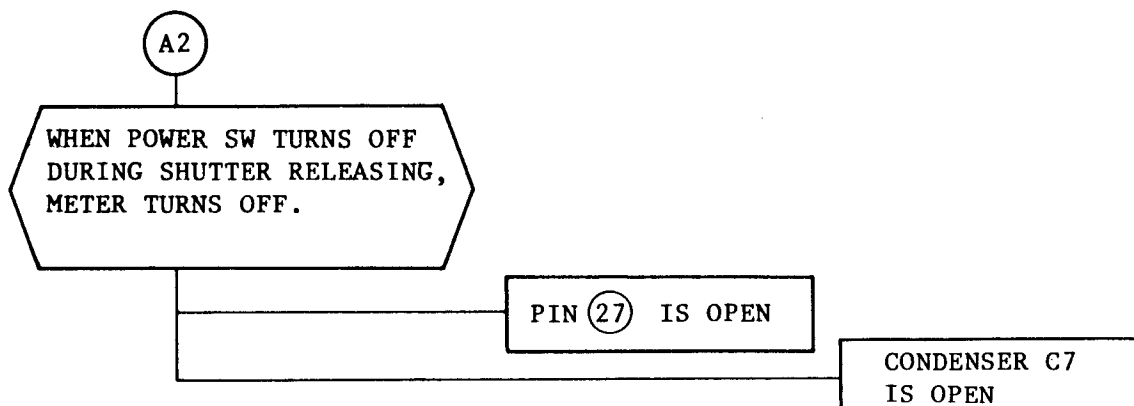
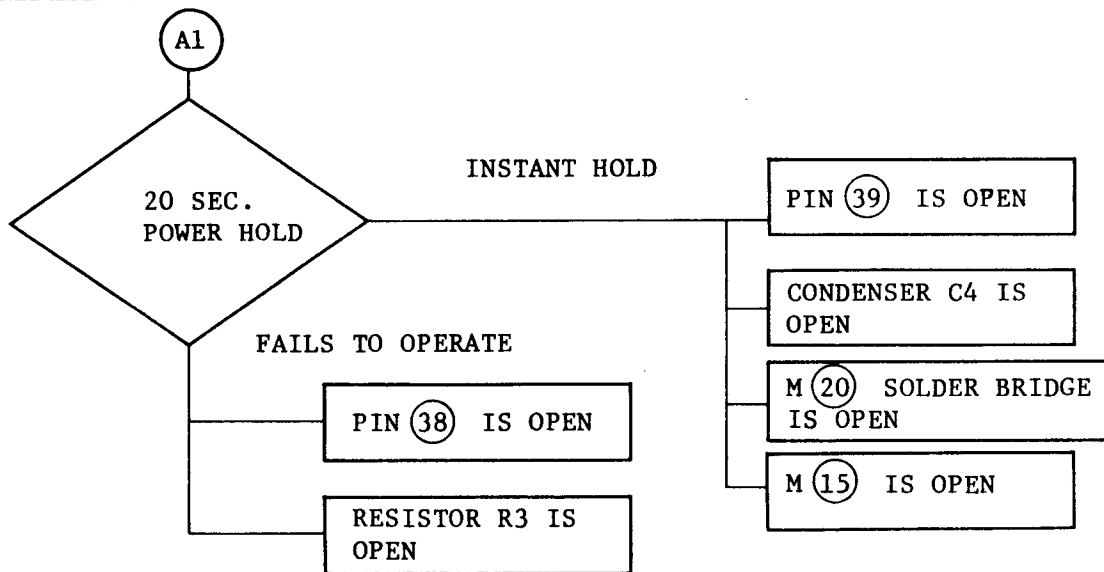
MG LEAD WIRE
IS OPEN

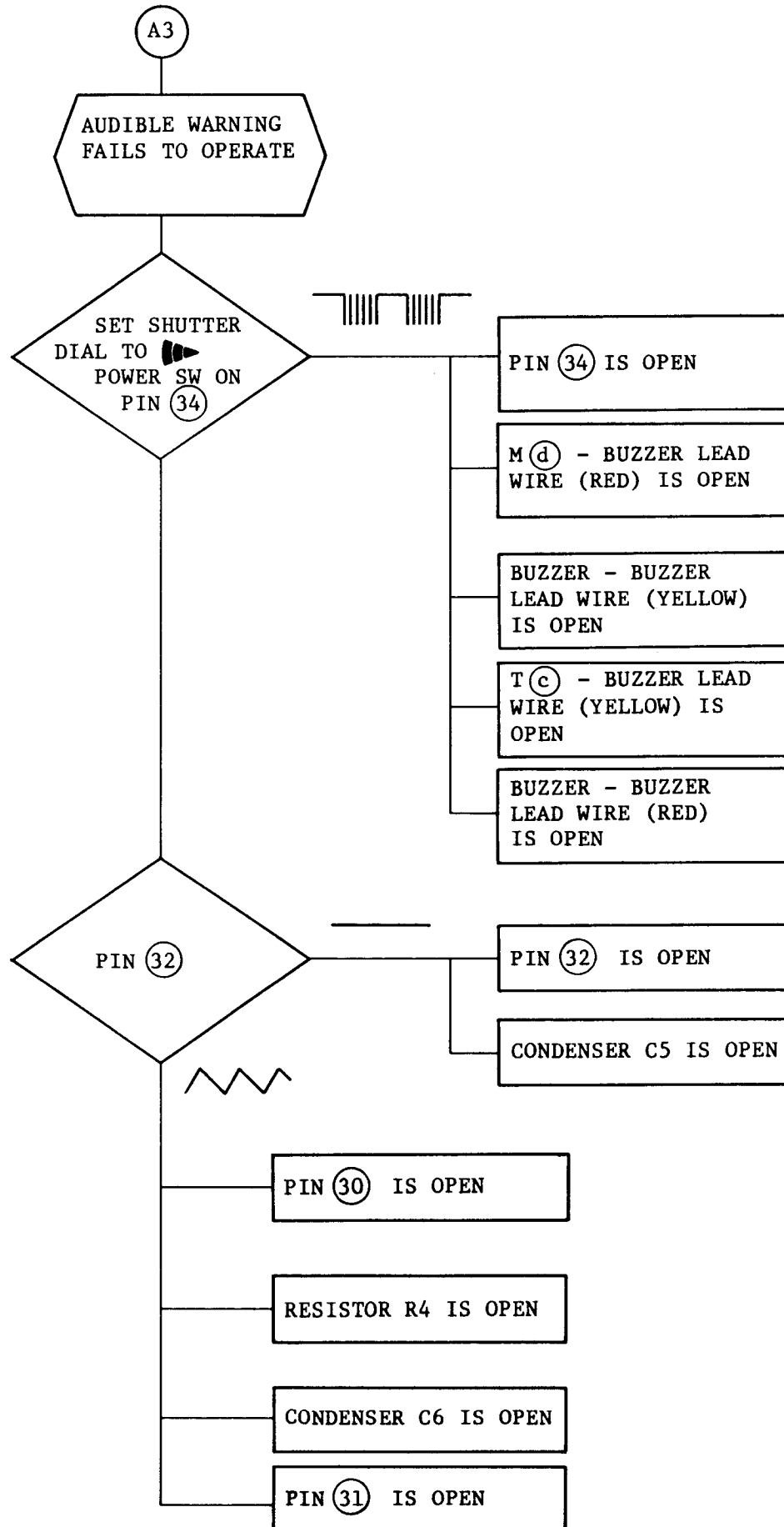


0 0 0 0 0

Item	Faulty section	Start code
Camera body	Battery check	A1
	Meter	A2
	Audible warning	A3
	Exposure compensation sw	A4
	Shutter speeds delivery	A5
Speedlight	Ready-light LED " $\frac{1}{2}$ "	B1
	Sync speed	B2
	Flash output	B3
Motor drive		C

A1 - C





A4

EXPOSURE COMPENSATION
FAILS TO OPERATE WHEN
WHEN EXPOSURE COMPENSATION
BUTTON IS DEPRESSED.

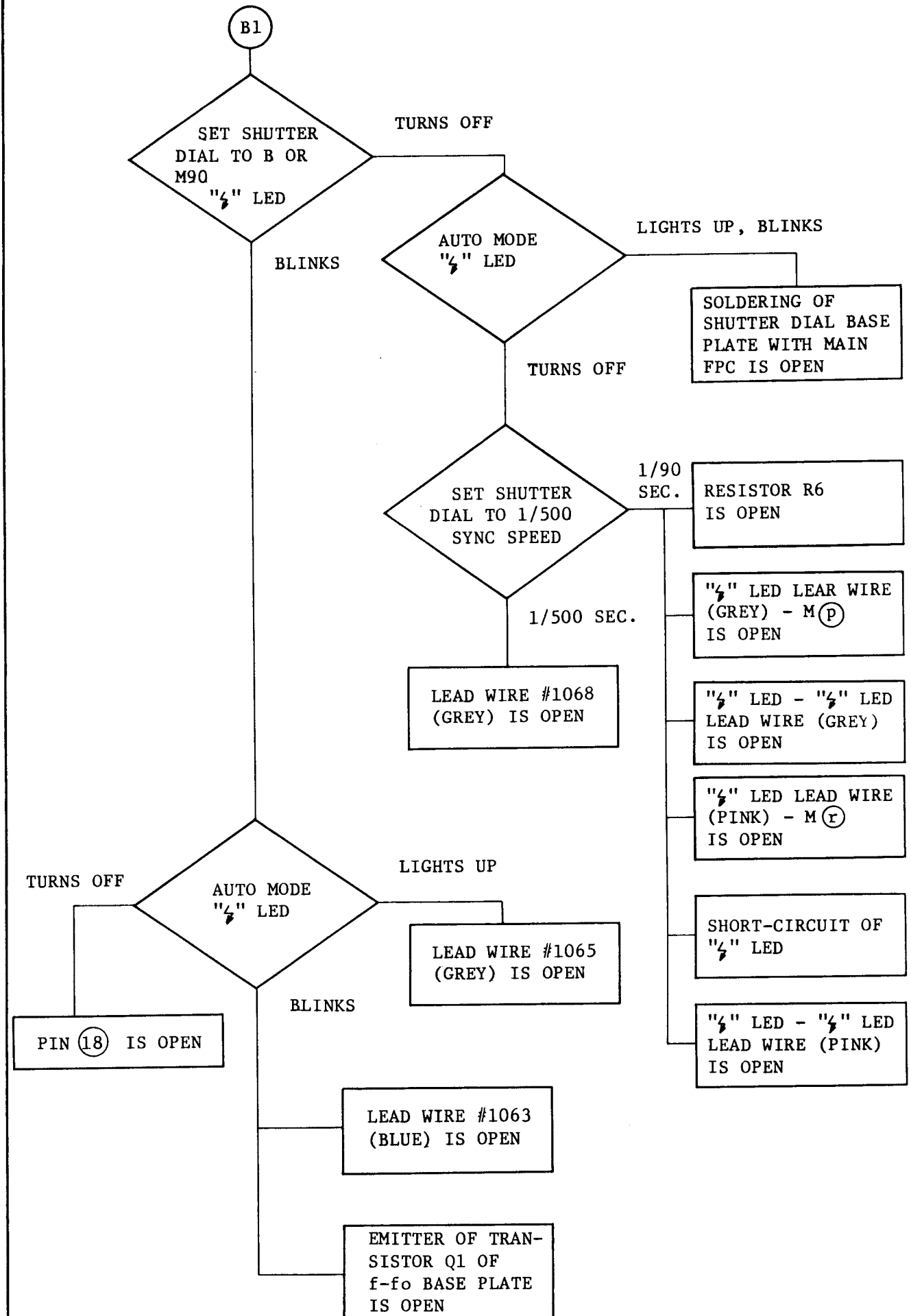
POOR CONTACT OF
EXPOSURE
COMPENSATION SW

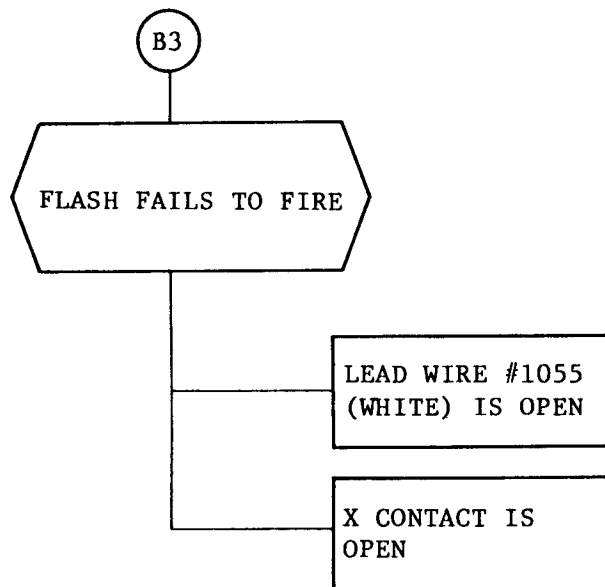
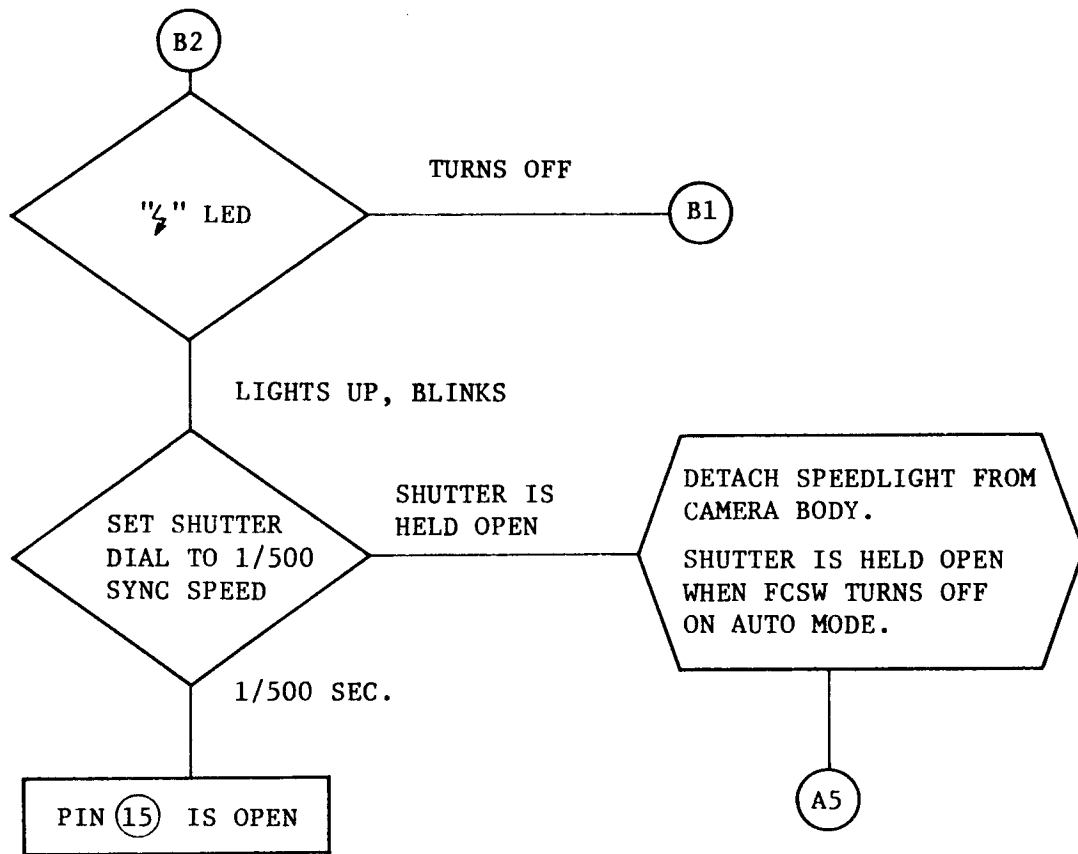
A5

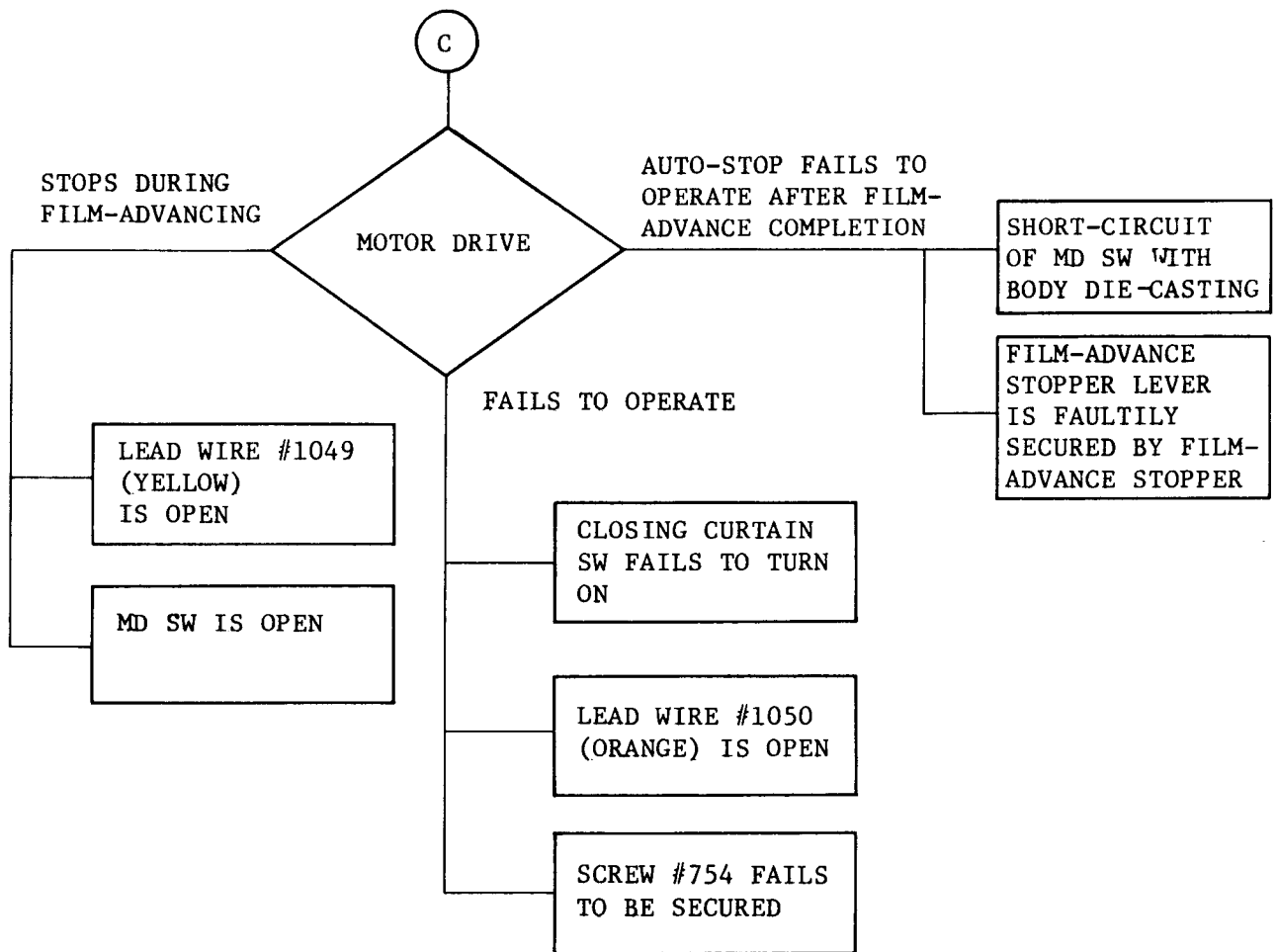
SHUTTER IS HELD OPEN
ON AUTO MODE WHEN FRAME
COUNTER SW TURNS OFF
(S, . , .).

PIN 24 IS OPEN

SOLDERING OF
SHUTTER DIAL
BASE PLATE WITH
MAIN FPC IS OPEN



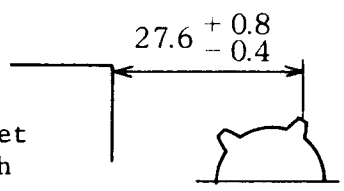
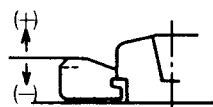
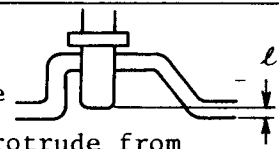



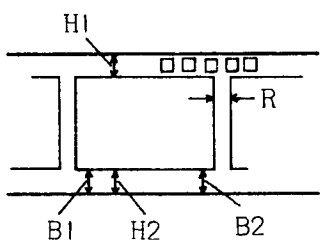


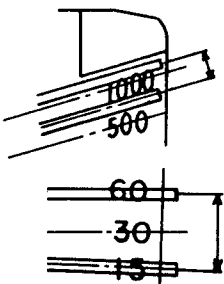
INSPECTION STANDARDS FOR REPAIR & TOOLS

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[1] INSPECTION STANDARDS FOR REPAIR	R1
[2] TOOLS	R5

[1] INSPECTION STANDARDS FOR REPAIR

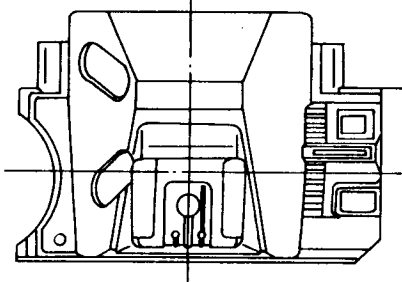
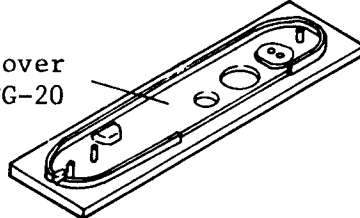
	Item	Standard	Tool
VIEWFINDER	Infinity focus	± 30 (K Type focusing screen)	J18001 J19001
	Dioptr	-1 ± 0.5 dpt. inside split-image	
	Image inclination	1° or less	
	Viewfinder coverage	$92^{+3}_{-1}\%$	
	Center-waitted pattern	$\phi 12$ 40% or more	
MIRROR BOX	Mirror return point	2 ± 1 mm from the mirror sponge	
	Aperture lever height	Shutter charged: 3.1 ± 0.1 mm Shutter released: $3.4 - 3.9$ mm Full stroke: 6.6mm or more Tension: 90 - 120g	J18004
FILM-ADVANCE MECHANISM	Film-advance lever angle	144°	
	Film-advance torque	2kg·cm or less (film unloaded) 3.2kg·cm or less (film loaded)	
	Spool	Slipping load: 130 - 240g	J5019
	Sprocket	<p>Play of tips of sprocket teeth: One tooth length or less</p> 	
SHUTTER RELEASE BUTTON	Stroke	<p>Height: 1mm or more Power sw ON: 0.7mm or less Release: $-0.2 - -0.6$mm</p> 	Slide caliper
	Tension	<p>a) Power sw ON: 50 - 200g b) Release: 250 - 400g c) Difference between a) and b): 100 - 300g</p>	J5019
REWIND BUTTON		<p>Set position: $l = 2.3^{+0.4}_{-0.3}$mm Full stroke: $l = 2.8$mm or more Original position: Not to protrude from the bottom cover</p> 	Slide caliper
FRAME COUNTER	Counter scale alignment		
	Frame counter sw	To be on when counter reaches to the position between S2 and 1 on Auto mode	

	Frame counter sw	Meter needle should indicate C90 before frame counter sw turns on on Auto mode	
MD FILM ADVANCE	Motor drive coupling	Winding angle: 360°	
	MD coupling torque	1.2kg·cm or less (film unloaded)	
	MD sw	To be off at the film-advance completion	
SELF-TIMER	Delay action time	7 - 15 sec.	
	Tension	Set: 500g·cm or less Cancel: 1kg·cm or less	
FILM RAILS	Flange focal distance	46.67±0.02mm Parallelness: 0.02mm or less Balance of height between internal and external film rails: 0.23±0.02mm Balance of height between internal film rails and aperture plate: 0.2mm or more	J18001-1 J19604
B.L. BUTTON	Exposure compensation sw ON position	+0.2 - -0.4mm from the collar of button	Slide caliper
	Tension	150 - 400g	
SYNCHRONIZATION	Time-lag	0.3 - 1ms	
	Contact efficiency	60% or more (gate time: 1ms, 1/90 sec.) 65% or more (gate time: 25ms, 1/30 sec.)	
	Insulation resistance	30MΩ or more (500V)	
LED	"M" LED	To be lighting during metering on M mode	
	Ready-light "1/2" LED	To light up when fully charged To blink when a improper f/stop is set (the SB-E only)	
PICTURE FRAME	Frame-to-frame space	$R=2\pm 1\text{mm}$	
	Variation of vertical/horizontal positions of frames	Vertically: $H1-H2=0.4\text{mm}$ or less Horizontally: $B1-B2=0.1\text{mm}$ or less	
	Picture frame size	$24^{+0.4}_{-0} \times 36^{+0.4}_{-0}$	
SHUTTER SPEEDS ACCURACY	Exposure unevenness	1/125 - 1: 0.2EV or less 1/250 - 1/1000: 0.6EV or less	J18072 J19036 J19040
	Variation	1/125 - 1: 0.3EV 1/250 - 1/1000: 0.45EV	
	Shutter speeds delivery via self-timer on Auto mode	LV15, F4, ASA 100 0.25EV or less	
	Difference between two adjacent settings	1/125 - 1: $1\pm 0.45\text{EV}$ 1/250 - 1/1000: $1\pm 0.65\text{EV}$	

SHUTTER SPEEDS ACCURACY	Exposure time on Manual mode			
	Shutter speed	Standard (ms)	Tolerance	
	M90	11.1	10.0 - 152	-0.15 - +0.45EV
	1	1000	1275 - 785	+0.35EV
	2	500	637 - 392	
	4	250	319 - 196	
	8	125	159 - 98.1	
	15	62.5	79.7 - 49.1	
	30	31.25	39.8 - 24.5	
	60	15.63	19.9 - 12.3	
	125	7.81	9.95 - 6.12	
	250	3.91	5.63 - 2.72	+0.525EV
	500	1.95	2.81 - 1.36	
	1000	0.98	1.41 - 0.68	
	Exposure time on Auto mode			
	Shutter speed	Standard (ms)	Tolerance	
	A90	11.1	10.0 - 16.3	-0.15 - +0.55EV
	1	1000	1275 - 637	+0.35 - -0.65EV
	2	500	637 - 318	
	4	250	319 - 159	
	8	125	159 - 79.7	
	15	62.5	79.7 - 39.8	
	30	31.25	39.8 - 19.9	
	60	15.63	19.9 - 9.95	
	125	7.81	9.95 - 4.98	
	250	3.91	4.98 - 2.49	
	500	1.95	2.49 - 1.24	
	1000	0.98	1.48 - 0.52	+0.6 - 0.9EV
AUDIBLE WARNING	Item	Standard		Tool
	Warning range	Buzzer should sound when meter needle positons within a range bellow. 		J18072 J19036 J19040

	Item	Standard	Tool
OTHERS	Power hold	$22.5^{+12.5}_{-7.5}$ sec. (battery voltage: more than 2.5V) 0 sec. (battery voltage: 2.38 - 2.5V)	
	Battery consumption	Metering Auto mode: 4mA or less Manual mode: 5mA or less Shutter releasing: 15mA	
	Exposure compensation	$2^{+0.4}_{-0.4}$ TV (ASA 25 - ASA 3200) Meter: 2^{+1}_{-1} EV	J18072 J19036 J19040
	Potential of S2 (contact for the SB-19 or SB-E) contact	1314^{+3}_{-3} mV (ASA 100, F5.6) 1421^{+15}_{-15} mV (ASA 100, F2)	J18073

[2] TOOLS

Tool No.	Name	Illustration	Class
J15236	Tool top cover		A
J15163	Positioning tool for B418	<p>Replace the bottom cover of Positioning tool J15163 for the EM with that of the FG-20 when using.</p> <p>Bottom cover of the FG-20</p> 	

PARTS LIST

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[3] ASEEMBLY LIST	P20

部品对照表

Parts Number Reference Table

補助番号 Auxiliary Number	部 品 番 号 Part Number	補助番号 Auxiliary Number	部 品 番 号 Part Number	補助番号 Auxiliary Number	部 品 番 号 Part Number
G 1	1G551-005	184	1K115-288-1	406	1K130-088-2
G 2	1G950-002-2	185	1K115-747	407	1K130-089
G 3	1G415-003-5	215	1K680-374	408	1K370-630-1
		220	1K115-748	410	1K130-090
		222	1K130-191	411	1K123-044
		229	1K225-083-1	412	1K370-324
		247	1K314-174	413	1K050-170
		248	1K230-120	414	1K050-063
22	1K080-027	249	1K640-409	415	1K340-037
27	1K680-344-1	250	1K314-175	416	1K220-054
31	1K080-028	251	1K230-121	419	1K120-077
101	1K400-078	259	1K120-166	421	1K225-054
104	1K100-035	282	1K314-179	429	1K480-016
105	1K080-005	296	1K230-123-1	431	1K230-068-1
106	1K115-852	313	1K130-192	433	1K120-078
107	1K115-746	331	1K362-033	434	1K370-325
108	1K607-002	332	1K220-132	439	1K240-095
110	1K680-375	333	1K115-203	447	T1-01000SX
113	1K610-258	340	1K230-125-1	465	1K275-006
119	1K115-281-1	350	1K404-033-1	466	1K275-007
120	1K115-282-1	351	1K240-303	470	1K630-105
121	1K115-283	355	1K680-349	500	1K260-045
122	1K115-284-3	356	1K680-350	512	1K640-442
135	1K206-025	357	1K230-127	521	1K300-037-2
137	1K120-165	358	1K130-193-1	526	1K130-091-1
138	1K083-037	359	1K240-293	528	1K314-183
139	1K480-014	365	1K680-352	529	1K206-026
140	1K314-165	368	1K680-353	530	1K136-009
150	1K600-149	370	1K600-140	531	1K206-027
154	1K314-103-2	371	1K233-034	532	1K245-009-3
159	1K115-286-2	372	1K115-846	533	1K640-245
178	1K610-384-1	373	1K233-017	534	1K208-040
179	1K240-345	376	1K576-055-1	535	1K370-632
181	1K240-118-2	377	1K115-752	542	1K201-042-1
182	1K406-013	388	1K115-791	547	1K150-049
183	1K082-006	403	1K640-410	562	1K470-037

部品对照表

Parts Number Reference Table

補助番号 Auxiliary Number	部 品 番 号 Part Number	補助番号 Auxiliary Number	部 品 番 号 Part Number	補助番号 Auxiliary Number	部 品 番 号 Part Number
601	1K630-216	737	B1-20030FB	1008	1S700-070
607	1K083-042	738	B2-20030FR	1015	1S542-002-1
608	1K146-075	739	B1-20035FB	1051	1S810-418
609	1K050-173	741	A1-20025FB	1052	1S810-419
610	1K480-015	745	P3-16060SX	1053	1S810-420
616	1K130-194	747	1K123-046	1054	1S810-421-1
618	1K680-358	748	1K146-067		
619	1K208-041	749	G1-17020FB		
622	1K233-035	750	A2-20025FB		
624	1K240-330	751	B1-17025FB		
628	1K240-300-1	754	A1-20035FA		
629	1K370-686	756	A1-17030FB		
630	1K630-237	759	1K050-029		
703	K2-14030FB	759	1K050-030		
704	K2-17060FB	759	1K050-031		
705	A1-17045FR	759	1K050-032		
707	A1-17025FC	759	1K050-033		
709	1K120-173	759	1K050-034		
710	1K120-174	759	1K050-035		
711	A2-17025FB	759	1K050-036		
712	1K120-084	759	1K050-037		
713	A1-17030FA	759	1K050-038		
714	A1-17030FS	759	1K050-039		
717	1K120-179	759	1K050-040		
722	1K146-035	759	1K050-041		
723	1K146-066	759	1K050-042		
724	B1-17040FB	759	1K050-043		
725	1K120-003	759	1K050-044		
727	H1-17028FB	759	1K050-045		
728	H1-17022FB	759	1K050-046		
729	A1-17035FC	759	1K050-047		
732	A1-20028FB	759	1K050-048		
733	A1-20035FB	760	1K050-177		
734	A1-20045FB	770	1K060-031		
735	A2-20035FC	772	S1-01500SX		
736	B1-20020FB	773	S1-01200SX		
		774	1K060-032		

Parts Number Reference Table

[illegible]

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
* 1K050-029	759	座 金 (t = 0.05) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-030	759	座 金 (t = 0.06) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-031	759	座 金 (t = 0.07) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-032	759	座 金 (t = 0.08) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-033	759	座 金 (t = 0.09) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-034	759	座 金 (t = 0.1) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-035	759	座 金 (t = 0.11) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-036	759	座 金 (t = 0.12) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-037	759	座 金 (t = 0.2) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-038	759	座 金 (t = 0.3) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-039	759	座 金 (t = 0.4) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-040	759	座 金 (t = 0.5) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-041	759	座 金 (t = 0.6) Washer	0 ~ 4	1B990-002-2	10	○△	F G

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
* 1K050-042	759	座 金 (t = 0.7) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-043	759	座 金 (t = 0.8) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-044	759	座 金 (t = 0.9) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-045	759	座 金 (t = 1) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-046	759	座 金 (t = 1.1) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-047	759	座 金 (t = 1.2) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-048	759	座 金 (t = 0.03) Washer	0 ~ 4	1B990-002-2	10	○△	F G
* 1K050-063	414	座 金 Washer	1		1	○	F G
1K050-170	413	座 金 Washer	1		1	○	
1K050-173	609	座 金 Washer	1		4	○	
1K050-177	760	座 金 Washer	1	1B990-002-2	8	○△	
1K060-031	770	A S A ダイアル S リング S - ring	1		4	○	
1K060-032	774	T ブラシギア G リング G - ring	1		5	○	

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部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 充 区 分 Term of Delivery	備 考 Remarks
* 1K080-005	105	三角環保護カバー Neck-strap ring cover	2		3	○	F G
1K080-027	22	エプロン Apron	1	1B990-002-2	9	○△	
1K080-028	31	銘 板 Name plate	1	1B990-006	11	○△	
1K082-006	183	ナンバープレート Number plate	1	1B670-041	12	○△	
1K083-037	138	セルフタイマー銘板 Self-timer index plate	1	1B990-002-2	10	○△	
1K083-042	607	巻戻しノブ Rewind knob	1	1B990-008	4	○△	
* 1K100-035	104	三角環 Triangular ring	2		3	○	F G
* 1K115-203	333	レンズ着脱ボタン飾 Lens release button	1	1B208-013 1B990-002-2	9	○△	F G
*(1K115-281) 1K115-281-1	119	ボディ下モルト Sponge pad, body	1		13	○	F G
*(1K115-282) 1K115-282-1	120	ボディ上モルトA Sponge pad, body	1		13	○	F G
* 1K115-283	121	ボディ上モルトB Sponge pad	1		13	○	F G
* 1K115-284-3	122	接眼下モルト Light-shield sponge	1		3	○	F G
*(1K115-286-1) 1K115-286-2	159	裏蓋モルト Light-shield sponge	1	1B670-041	12	○△	F G

部 品 表 Parts list

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部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 Term of Delivery	備 考 Remarks
* 1K115-288-1	184	裏蓋遮光紙 Light baffle	1	1B670-041	12	○△	F G
1K115-746	107	巻上側擬革 Leatherette	1		13	○	
1K115-747	185	シュー絶縁シート Insulating sheet	1	1B990-006	11	○△	
1K115-748	220	UPバネモルト UP spring sponge	1	1B990-002-2 1B001-488-3	7	○△	
1K115-752	377	視野枠モルト Finder field frame sponge	1	1B990-002-2 1B001-483	10	○△	
1K115-791	388	黒テープ Tape	4	1B990-002-2	3, 6 8, 10	○△	
1K115-846	372	ミラーストッパーモルト Mirror stopper sponge	1	1B990-002-2 1B001-522	9	○△	
1K115-852	106	ボディ擬革 Leatherette	1		13	○	
* 1K120-003	725	ストッパービス Stopper screw	1	1B990-002-2 1B001-488-3	7	○△	F G
* 1K120-077	419	カップリングビス Coupling screw	1		1	○	F G
* 1K120-078	433	カウンタービス Frame counter shaft screw	1	1B990-001-1	5	○△	F G
* 1K120-084	712	シュー座ビス Hot-shoe screw	4	1B990-006	11	○△	F G
1K120-165	137	セルフビス Self-timer screw	1	1B990-002-2	10	○△	

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1K120-166	259	リリース軸ビス Release shaft screw	1	1B990-002-2 1B001-488-3	7	○△	
1K120-173	709	Tプリント板ビスB Screw, printed circuit	1		5	○	
1K120-174	710	T基板ビス Screw, printed circuit	1		5	○	
1K120-179	717	巻上基板ビスB Screw, film-advance base	1		5	○	
1K123-044	411	スプロクラッチビス Sproket screw	1		1	○	FG
* 1K123-046	747	Bマウントビス Bayonet set screw	4	1B990-002-2	9	○△	FG
*(1K130-088) 1K130-088-2	406	カムチャージレバー軸 Charge transmission lever	1		2	○	FG
* 1K130-089	407	チャージ中間レバー軸 Mirror charge lever shaft	1		2	○	FG
* 1K130-090	410	レシプロレバービス Shutter charge lever shaft	1		2	○	FG
*(1K130-091) 1K130-091-1	526	スライドレバービス Screw, release lever	2		3	○	FG
1K130-191	222	ミラーSWビス Screw, mirror switch	1	1B990-002-2	7	○△	
1K130-192	313	ダウンバネ軸 Mirror-down spring axle	1	1B990-002-2	6	○△	23 FB #358
1K130-193-1	358	f o レバー軸 fo lever axle	1	1B990-002-2	6	○△	

部 品 番 号 Part No.		補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1 K 130 - 194		616	B. L スイッチレバー軸 Axle, exposure compensation switch lever	1		4	○	
* 1 K 136 - 009		530	指当て軸 Screw, film- advance lever knob	2	1 B 206 - 022 - 1	5	○△	F G
1 K 146 - 075		608	ノブ取付ビス Rewind knob switch	1	1 B 990 - 008	4	○△	F G
* 1 K 146 - 035		722	カウンター S W ビス Screw, counter switch	1	1 B 990 - 001 - 1	5	○△	F E 2
1 K 146 - 066		723	半押 S W ビス Screw, release button switch	1		3	○	
1 K 146 - 067		748	位相 S W ビス Screw, MD switch	1		2	○	
1 K 150 - 049		547	T ダイヤル 止めナット Nut, shutter dial	1		5	○	
1 K 201 - 042 - 1		542	T ダイヤル Shutter dial	1		5	○	
1 K 206 - 025		135	セルフレバー Self - timer lever	1	1 B 990 - 002 - 2	10	○△	
1 K 206 - 026		529	レバー 指当 Knob, film advance lever	1	1 B 206 - 022 - 1	5	○△	
1 K 206 - 027		531	巻上レバー Film advance lever	1	1 B 206 - 022 - 1	5	○△	
1 K 208 - 040		534	リリース釦 Release button	1		5		

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 充 区 分 Term of Delivery	備 考 Remarks
1 K 208 - 041	619	B . L 釦 Exposure compensation button	1		4	○	
* 1 K 220 - 054	416	R 釦バネ Sprocket spring	1		1	○	F G
1 K 220 - 132	332	着脱バネ Lens release button spring	1	1 B 990 - 002 - 2	8	○△	
* 1 K 225 - 054	421	スライドレバーバネ Release lever spring	1		3	○	F G
1 K 225 - 083 - 1	229	ミラーアップバネ Mirror - up spring	1	1 B 990 - 002 - 2 1 B 001 - 488 - 3	7	○△	
* (1 K 230 - 068) 1 K 230 - 068 - 1	431	カウンター戻しバネ Frame counter screw	1	1 B 990 - 001 - 1	5	○△	F G
1 K 230 - 120	248	連続カギバネ Continuous hook spring	1	1 B 990 - 002 - 2 1 B 001 - 488 - 3	7	○△	23 F B #372
1 K 230 - 121	251	リリースカギバネ Start hook spring	1	1 B 990 - 002 - 2 1 B 001 - 488 - 3	7	○△	23 F B #309
1 K 230 - 123 - 2	296	チリトリバネ Spring, mirror holder	1	1 B 990 - 002 - 2	8	○△	
1 K 230 - 125 - 1	340	ダウンバネ Mirror - down spring	1	1 B 990 - 002 - 2	6	○△	23 F B #332
1 K 230 - 127	357	f o バネ fo spring	1	1 B 990 - 002 - 2	6	○△	
* 1 K 233 - 017	373	ペンタ押えバネ B Prism retaining spring B	1		10	○	F G
1 K 233 - 034	371	ペンタ押えバネ A Prism retaining spring A	1		10	○	

部 品 表 Parts list

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部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1 K 233 - 035	622	巻戻クリックバネ Rewind Click spring	1	1 B 001 - 489	4	○△	
* 1 K 240 - 095	439	R 釦保持バネ Rewind button retaining spring	1		1	○	F G
* (1 K 240 - 118 - 1) 1 K 240 - 118 - 2	181	シューバネ Hot shoe spring	1	1 B 990 - 006	11	○△	F G
1 K 240 - 293	359	f o ブラシ fo contact	1	1 B 990 - 002 - 2 1 B 001 - 487	6	○△	
1 K 240 - 300 - 1	628	巻戻ノブバネ Rewind knob spring	1		4	○	
1 K 240 - 303	351	マウントバネ Bayonet spring	1	1 B 990 - 002 - 2	9	○△	23 F B #208
1 K 240 - 330	624	巻戻レバーバネ Rewind lever spring	1	1 B 990 - 008	4	○△	
1 K 240 - 345	179	S P D 押え SPD holder	1		10	○	
*(1 K 245 - 009) 1 K 245 - 009 - 3	532	指当クリックバネ Click spring, film advance lever knob	1	1 B 206 - 022 - 1	5	○△	F G
* 1 K 260 - 045	500	カウンターギア Frame counter gear	1	1 B 990 - 001 - 1	5	○△	F G
* 1 K 275 - 006	465	スプール Spool	1		1	○	23 F B #506
* 1 K 275 - 007	466	スプロケット Sprocket	1		1	○	F G
*(1 K 300 - 037) 1 K 300 - 037 - 2	521	巻上カム Film advance cam	1		1	○	F G

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
* (1K314-103) 1 K 314 - 103 - 2	154	止め爪 Latch, camera back	1		13	○	F G
1 K 314 - 165	140	セルフ板 Self-timer lever plate	1	1B990-002-2	10	○△	
1 K 314 - 174	247	連続カギ Continuous release hook	1	1B001-488-3 1B990-002-2	7	○△	
1 K 314 - 175	250	レリーズカギ Mirror start hook	1	1B001-482 1B990-002-2	7	○△	23 FB #307
1 K 314 - 179	282	レリーズレバー See-saw lever	1		8	○△	23 FB #498
1 K 314 - 183	528	チャージ中間レバー Charge lever	1		2	○	
1 K 340 - 037	415	カムチャージレバーカラー Cam charge lever collar	1	1B314-111-1		○△	
1 K 362 - 033	331	着脱ピン Lens release pin	1	1B990-002-2 1B990-004	8	○△	23 F B #212
* 1 K 370 - 324	412	R 釦 Rewind button	1		1	○	F G
1 K 370 - 325	434	カウンター軸 Counter axle	1			○	
1 K 370 - 630-1	408	巻上カムローラ軸 Shaft, film-advance cam roller	1	1B314-111-1	2	○△	
1 K 370 - 632	535	レリーズ中間ピン Release pin	1		5	○	
1 K 370 - 686-1	629	巻戻軸股 Rewind shaft	1		4	○	
* 1 K 400 - 078	101	三脚ネジ Tripod screw	1		2	○	F G
* (1K404-033) 1 K 404 - 033 - 1	350	マウント Bayonet ring	1	1B990-002-2	9	○△	F G

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1 台 分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
* 1K406-013	182	シュー座 Hot shoe	1	1B990-006	11	○△	F G
1K470-037	562	T目盛板 Shutter speed index	1		5	○	
1K480-014	139	セルフ銘板 Self-timer index plate	1		10	○	
1K480-015	610	フィルム位置マーク板 Film position index	1	1B990-006	11	○△	
1K480-016	429	カウンター指標板 Frame-counter index	1	1B990-001-1	5	○△	
1K576-055-1	376	視野枠 Finder field frame	1		10	○	
* 1K600-140	370	プリズム押えシート Prism retaining seat	1		10	○	F G
* 1K607-002	108	レシプロゴム Shock absorb rubber	1		2	○	F G
* 1K610-258	113	電池室カラー Battery earth connector	1		2	○	F G
*(1K610-384) 1K610-384-1	178	シュー座止め板 Shoe washer	1	1B990-006	11	○△	F G
* 1K630-105	470	スプールカラー Spool internal tube	1		1	○	F G
1K630-216	601	巻戻軸 Rewind shaft	1	1B001-489	4	○△	

				F A A 10001-R. 5142. A			
部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 充 区 分 Term of Delivery	備 考 Remarks
1 K 640 - 409	249	リリース軸カラー Release shaft collar	1	1 B 990 - 002 - 2 1 B 001 - 488 - 3	7	○△	
1 K 640 - 410	403	巻上カムローラー Film advance cam roller	1	1 B 314 - 111 - 1	2	○△	
1 K 640 - 442	512	スプール遮光板 Light - tight washer	1		1	○	
1 K 680 - 344 - 1	27	前板カバー Front plate cover	1	1 B 990 - 002 - 2	9	○△	
1 K 680 - 349	355	着脱モールド Lens release button mold	1	1 B 990 - 002 - 2	8	○△	
1 K 680 - 350	356	f o 連動片 fo coupling lever	1	1 B 990 - 002 - 2	9	○△	23 F B #275-1
1 K 680 - 352	365	f o カバー fo lever cover	1	1 B 990 - 002 - 2	9	○△	23 F B #274
1 K 680 - 353	368	防塵モールド Screen frame spacer	1		10	○	
1 K 680 - 358	618	B. L 釦飾環 Exposure compensation button guide	1		4	○	
1 K 680 - 374	215	ストッパー Stopper	1	1 B 990 - 002 - 2 1 B 001 - 488 - 3	7	○△	
1 K 680 - 375	110	止め爪カバー Cover	1		13	○	

部 品 表 Parts list

FAA18001-R. 3142. A

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1 台 分 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1 S 542 - 002-1	1015	圧電ブザー Buzzer	1		6	○	
1 S 700 - 070	1008	MD基板 Printed circuit	1		2	○	
1 S 810 - 409	1041	リード線 Lead wire	1	1 S 007 - 044 - 2		△	W - 0056 RE
1 S 810 - 410	1042	リード線 Lead wire	1	1 S 007 - 044 - 2		△	W - 0056 GN
1 S 810 - 411	1043	リード線 Lead wire	1	1 S 007 - 044 - 2		△	W - 0056 BN
1 S 810 - 412	1044	リード線 Lead wire	1	1 S 007 - 044 - 2		△	W - 0056 BE
1 S 810 - 413	1045	リード線 Lead wire	1	1 S 007 - 044 - 2		△	W - 0056 PU
1 S 810 - 414	1047	リード線 Lead wire	1			×	W - 0056 RE
1 S 810 - 415-1	1048	リード線 Lead wire	1	1 B 060 - 186 - 2		△	W - 0056 BK
1 S 810 - 416	1049	リード線 Lead wire	2			×	W - 0056 YE
1 S 810 - 417	1050	リード線 Lead wire	1			×	W - 0056 OR
1 S 810 - 418	1051	リード線 Lead wire (Red)	1		3	○	
1 S 810 - 419	1052	リード線 Lead wire (Yeilow)	1		3	○	

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台 個 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1 S 810 - 420	1053	リード線 Lead wire (White)	1		3	○	
1 S 810 - 421-1	1054	リード線 Lead wire (Blue)	1		3	○	
1 S 810 - 422	1055	リード線 Lead wire	1			×	W - 0056 WH
1 S 810 - 423	1056	リード線 Lead wire	1			×	W - 0056 WH
1 S 810 - 428-2	1061	リード線 Lead wire	1	1 B 990 - 002 - 2 1 B 001 - 481 - 2		△	W - 0056 PU
1 S 810 - 429	1062	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 047		△	W - 0056 BN
1 S 810 - 430	1063	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 047		△	W - 0056 BE
1 S 810 - 431-1	1064	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 047		△	W - 0056 OR
1 S 810 - 432	1065	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 047		△	W - 0056 GY
1 S 810 - 433	1066	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 048		△	W - 0056 PU
1 S 810 - 434	1067	リード線 Lead wire	1	1 B 990 - 002 - 2 1 S 007 - 048		△	W - 0056 PU
1 S 810 - 435	1068	リード線 Lead wire	1			×	W - 0056 GY

部 品 表 Parts list

FAA18001-R. 3142. A

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1 台 分 数 Pcs. per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 期 間 Term of Delivery	備 考 Remarks
A1-17025 FC	707	小ねじ Screw	4		11	○	
A1-17030 FA	713	小ねじ Screw	2		3	○	
A1-17030 FB	756	小ねじ Screw	2	1B990-002-2	7	○△	
A1-17030 FS	714	小ねじ Screw	1		3	○	
A1-17035 FC	729	小ねじ Screw	3	1B990-002-2	9.11	○△	
A1-17045 FR	705	小ねじ Screw	2	1B990-002-2	9	○△	
A1-20025 FB	741	小ねじ Screw	2		13	○	
A1-20028 FB	732	小ねじ Screw	5	1B990-002-2	1.9.10	○△	
A1-20035 FA	754	小ねじ Screw	1		2	○	
A1-20035 FB	733	小ねじ Screw	5		4.10	○	
A1-20045 FB	734	小ねじ Screw	4		3.10	○	
A2-17025 FB	711	小ねじ Screw	2	1B990-002-2	8	○△	
A2-20025 FB	750	小ねじ Screw	1	1B990-002-2	6	○△	

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 Term of Delivery	備 考 Remarks
A2-20035FC	735	小ねじ Screw	3		2	○	
B1-17025FB	751	小ねじ Screw	1	1B990-002-2	6	○△	
B1-17040FB	724	小ねじ Screw	2		10	○	
B1-20020FB	736	小ねじ Screw	2	1B990-002-2	8	○△	
B2-20030FB	737	小ねじ Screw	5		4.5	○	
B1-20035FB	739	小ねじ Screw	4	1B990-002-2	10	○△	
B2-20030FR	738	小ねじ Screw	1		9	○	
G1-17020FB	749	タップタイトねじ Screw	1		10	○	
H1-17022FB	728	タップタイトねじ Screw	1	1B990-002-2 1B001-487	6	○△	
H1-17028FB	727	タップタイトねじ Screw	1		5	○	
K2-14030FB	703	止ねじ Screw	1	1B206-022-1	5	○△	
P3-16060SX	745	スプリングピン Pin	2		3	○	
S1-01200SX	773	止め輪 E-ring	1	1B990-001-1 1B314-111-1	2	○△	
K2-17060FB	704	止めねじ Screw	1			○	

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[illegible]

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
* 1B001-085	B102	吊 環 Eyelet	2	1K100-034 1K044-001	3	FA
* 1B001-121	B99	セルフタイマー Self-timer	1		8	FG
△(1B001-136) 1B001-135-3	B464	スプール軸 Spool shaft	1	1K370-327-1. 1K250-044 1K220-056. 1K600-145 1K600-248×2	1	FG
△ 1B001-145-1	B150	圧 板 Pressure plate	1	1K600-149. 1K240-112-1 1K370-192×2	12	FG
1B001-522	B374	スクリーン枠 Screen retaining frame	1	1K620-041. 1K115-846 1K240-092×2. 1K370-244-1×2	9	
1B001-477	B637	ASAブラシ板 ASA brush	1	1K640-413 1K240-301	4	
1B001-478	B443	位相スイッチ MD switch	1	1K680-377. 1K600-144 1K240-097. 1K240-096	2	
1B001-479-1	B180	シューモールド Shoe mount mold	1	1K680-347. 1K370-620-1 1K370-621×2	11	
1B001-481-3	B265	ミラースイッチ Mirror switch	1	1K680-348. 1K115-751 1K240-291. 1K240-292 1S810-428-2	7	
1B001-482	B281	連続リリースレバー Release lever	1	1K610-503. 1K370-627 1K370-628. 1K314-177 1K630-212. 1K230-122 1K050-163. 1K314-179 S1-01500SX. 1K314-176 1K370-626. 1K630-211 1K314-178.	8	

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1B001-483	B378	視野枠 Focusing screen frame	1	1K620-092 1K115-752	1	
1B001-484-1	B501	T ブラシギヤ Brush gear, shutter dial	1	1K260-134-1 1K240-297 1K240-298	4	
1B001-485	B424	半押スイッチ Release button switch	1	1K580-376. 1K600-142 1K240-099-1. 1K240-098-1	3	
1B001-486-2	B620	B.L 接点 Exposure compensation switch contact	1	1K314-185-1 1K240-299-1	4	
1B001-487	B364	fo レバー fo lever	1	1K580-351. 1K240-293 H1-17022FB	6	
1B001-488-4	B201	I 基板 Mirror actuating unit	1	1K610-502. 1K048-067 1K314-170. 1K340-070 1K156-033. 1K314-168 1K314-173. 1K050-175 1K230-118. 1K370-622 1K156-036. 1K314-172 1K050-178. 1K370-625-1 1K314-175. 1K314-174 1K640-409. 1K120-166 1K230-120. 1K230-121 1K366-012. 1K680-374 1K120-003. 1K115-750 1K225-083-1 1K314-169. 1K115-748 1K366-041-1 1K314-171-1 1K230-119. 1K370-624 1K314-166. 1K366-016-1 1K370-623. 1K640-238	7.8	

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1B001-489	B601	巻戻軸受 Rewind shaft bearing	1	1K630-216. 1K630-237 1K233-035.	4	
* 1B060-037	B418	モーターカップリング Motor coupling	1	1S700-014 1K340-033	1	23FB A8
1B060-173	B100	シャッター Shutter	1		3	
1B060-186-2	B111	電池ケース Battery chamber	1	1K680-346. 1K240-050-2 1K240-329. 1K048-070 1S810-415-1	3	
1B060-188	B379	プリズムボックス Prism box	1	1K620-093 H1-17040FB	10	
1B060-189	B417	カウンタースイッチ Counter switch	1	1K680-355. 1K240-341 1K600-143. 1K240-342	5	
1B100-260	B381	接眼モールド Eyepiece frame mold	1	1K500-407. 1G138-001-1 1K510-241-1 1G104-018 1G247-017	10	
1B100-261-1	B290	チリトリ Mirror holder	1	1K610-504-1. 1G551-005 1K360-009. 1K115-270	8	
1B200-004	B625	巻戻レバー Rewind lever	1	1K610-256. 1K630-233 1K370-340	4	
1B201-022	B603	ASAダイヤル ASA dial	1	1K201-043. 1K640-412 1K275-031. 1K470-038 1K246-010	4	
1B206-022-1	B531	巻上レバー Film-advance lever	1	1K206-027. 1K206-026 1K245-009-3. 1K136-009×2. K2-14030FB	5	
1B208-013	B352	着脱釦 Lens release button	1	1K115-203 1K208-039	9	

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1 B 260 - 021	B 469	スプロ軸 Sprocket shaft	1	1K 250 - 142 1K 370 - 685	9	
1 B 260 - 022	B 362	連動軸 Aperture couplirg ring gear	1	1K 260 - 131 1K 230 - 124	1	
1 B 314 - 110	B 522	スライドレバー Release lever	1	1K 314 - 181 1K 366 - 049 × 2	3	
1 B 314 - 111 - 1	B 405	チャージレバー Charge lever	1	1K 314 - 096. 1K 314 - 095 1K 370 - 323. 1K 370 - 321 T1 - 01000 SX × 9 1K 370 - 630 - 1 1K 640 - 410 S1 - 01200 SX. 1K 340 - 037	2	
1 B 340 - 004	B 404	スプール軸受 Spool shaft metal	1	1K 640 - 411. 1K 640 - 196 1K 640 - 202. T1 - 01000 SX × 3	1	
* (1 B 467 - 007 - 1) 1 B 467 - 007 - 2	B 112	電池キャップ Battery chamber lid	1	1K 467 - 017 - 2 1K 630 - 082	2	FA
1 B 610 - 020 - 1	B 338	チリトリヒンジ板 Mirror holder hinge plate	1	1K 610 - 505 1K 366 - 043 - 1	6	
1 B 640 - 023 - 1	B 361	連動環 Aperture coupling ring	1	1K 260 - 130 - 1 1K 240 - 294	9	
1 B 670 - 041	B 025	裏 蓋 Camera back	1	1K 620 - 091. 1K 680 - 098 - 2 1K 600 - 079. 1K 240 - 302 1K 370 - 619. 1K 370 - 580 × 2 1K 115 - 287. 1K 115 - 286 - 2 1K 115 - 288 - 1. 1K 082 - 006	12	
1 B 670 - 043 - 1	B 024	底 蓋 Bottom cover	1	1K 670 - 037 1K 115 - 847 - 1	2	
1 B 314 - 107	B 276	リリースレバー Release lever	1	1K 314 - 176. 1K 370 - 626 1K 630 - 211. 1K 314 - 178		

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1 B 990 - 001 - 1	B 2541	巻上基板 Film - advance base unit	1	1 B 060 - 189. 1 K 275 - 037 1 K 470 - 042. 1 K 610 - 507 1 K 630 - 214 - 1. 1 K 640 - 248 - 1 1 K 370 - 633. 1 K 314 - 184 1 K 370 - 647. 1 K 370 - 333 1 K 340 - 074. 1 K 314 - 182 1 K 340 - 072. 1 K 260 - 038 1 K 600 - 303. 1 K 370 - 546 1 K 314 - 189. 1 K 370 - 698 1 K 240 - 093 - 2. 1 K 362 - 012 × 3 1 K 220 - 139 × 3. 1 K 480 - 016 1 K 230 - 068 - 1. 1 K 120 - 078 1 K 250 - 132. 1 K 275 - 030 1 K 600 - 146. 1 K 260 - 045 1 K 233 - 036 1 K 640 - 245. 1 K 340 - 073 1 K 230 - 070 - 1. 1 K 146 - 035 1 K 060 - 009. S 1 - 01200 SX	5	
1 B 990 - 003	B 428	カウンターモールド Frame counter gear	1	1 K 275 - 037 1 K 470 - 042	5	
1 B 990 - 004	B 331	着脱ピン Lens release pin	1	1 K 362 - 033 S 1 - 01500 SX	8	
1 B 990 - 006	B 2023	上カバー Top cover	1	1 K 670 - 036 - 1. 1 K 480 - 015 1 K 680 - 359. 1 K 680 - 345 - 1 1 K 080 - 028. 1 K 680 - 357 1 K 680 - 356. 1 K 220 - 133 1 K 240 - 296. 1 K 115 - 747 × 2 1 B 001 - 479. 1 K 610 - 384 - 1 1 K 240 - 118 - 2 1 K 406 - 013 1 K 120 - 084 × 4	11	

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1B990-002-2	B026	前 板 Front plate		1B001-121. 1B001-488-2		
				1B001-481. 1B001-482		
				1B100-261. 1B990-004		
				1B610-020. 1B208-013		
				1B640-023. 1B260-022		
				1B001-487. 1B001-155		
				1B001-483. 1S007-047		
				1S007-048. 1K083-027		
				1K670-038-2. 1K680-344		
				1K206-025. 1K120-165		
				1K083-037. 1K314-165		
				1K130-191. 1K230-123		
				1K130-192. 1K220-132		
				1K230-125. 1K404-033-1		
				1K240-303-1. 1K680-349		
				1K680-350. 1K230-127		
				1K130-193. 1K680-352		
				1K115-791×2.		
				A1-17045FR×2		
				A2-17025FB×2		
				A1-17035FC		
				A1-20028FB×2.		
				B1-20020FB×2		
				B1-20035FB×4		
				1K123-046×4.		
				A2-20025FB. B1-17025FB		
				A1-17030FB×2		
				1K050-029. 1K050-030		
				1K050-031. 1K050-032		
				1K050-033. 1K050-034		
				1K050-035. 1K050-036		
				1K050-037. 1K050-038		
				1K050-039. 1K050-040		
				1K050-041. 1K050-042		
				1K050-043. 1K050-044		
				1K050-045. 1K050-046		
				1K050-047. 1K050-048		
				1S542-002. 1K050-177		

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs. per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1B990-007	B548	T基板 Shutter dial base plate	1	1K260-133. 1K630-215 1K680-371	5	
1B990-008	B607	巻戻ノブ Rewind knob	1	1B200-004. 1K083-042 1K146.-023. 1K240-330	4	
1S007-044-3		ICプリント板 Main FPC	1	1S705-036-1. 1S320-014 1S237-040. 1S340-046 1S340-047. 1S340-048 1S340-049. 1S340-050 1S335-038. 1S310-047 1S310-048. 1S310-049 1S310-054 × 2. 1S322-030 1S322-031 × 2. 1S322-032 1S322-034. 1S250-003 1S810-409. 1S810-410 1S810-411. 1S810-412 1S810-413. 1S340-054 1S322-038. 1S700-068. 1S310-046 1S310-050. 1S310-051 1S310-052. 1K610-509-1	10	
1S007-047-1	B1005	f o 基板 fo base plate	1	1S320-015. 1S120-009 1S310-053. 1S810-429 1S810-430. 1S810-431-1 1S810-432.	5	
1S007-048	B1006	f - fo 基板 f- fo base plate	1	1S322-039. 1S810-433 1S810-434	8	

部 品 番 号 Part No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	部 組 品 番 号 Assembly	参照図番 Figure	販 売 区 分 Term of Delivery	備 考 Remarks
1K080-034	22	エプロン (黒) Apron (black)	1	1B990-020		○△	
1K082-007	183	ナンバープレート (黒) Number plate (black)	1	1B670-045		○△	
1K670-050	23	上カバー (黒) Top cover (black)	1	1B670-044		△	
1K670-051	24	底カバー (黒) Bottom cover (black)	1			○	
1K001-007	707	Screw	4			○	
1K001-008	729	Screw	3	1B990-020		○△	
1K001-011	735	Screw	3			○	

※ 他の部品は FAA18001 (白) と同じ

※ THIS LIST CONTAINS SPECIAL PARTS FOR FG-20
BLACK BODY ONLY. REFER OTHER PARTS TO LIST
OF FG-20 CHROME BODY (FAA18001).

部 組 品 番 号 Assembly No.	補助番号 Ckt. No.	名 称 Name	1台分 個 数 Pcs.per Unit	構 成 部 品 番 品 Constituent Parts	参照図番 Figure	備 考 Remarks
1B670-044	B2023	上カバー (黒) Top cover (black)	1	1K080-028 ,1K115-747 1K220-133 ,1K240-296 1K480-015 ,1K670-050 1K680-345-1,1K680-356 1K680-357 ,1K680-359		
1B670-045	B205	裏 蓋 (黒) Camera back (black)	1	1K082-007 ,1K115-286-2 1K115-288-1,1K115-893 1K115-492 x2 1K240-302 ,1K370-619 1K370-580 x2 1K600-079 ,1K620-091 1K680-432		
1B990-020	B026	前 板 (黒) Front plate (black)	1	1K001-008 ,1K050-029 1K050-030 ,1K050-031 1K050-032 ,1K050-033 1K050-036 ,1K050-037 1K050-038 ,1K050-039 1K050-040 ,1K050-041 1K050-042 ,1K050-043 1K050-044 ,1K050-045-1 1K050-046-1,1K050-047-1 1K050-048 ,1K050-135 1K050-177 ,1K080-034-2 1K083-037 ,1K120-165 1K115-791 x2 1K123-046 x4 1K130-191 ,1K130-192 1K206-025 ,1K220-132 1K230-123-2,1K230-125-1 1K230-127 ,1K240-303 1K314-165 ,1K314-165 1K404-033-1,1K680-344-1 1K680-349 ,1K680-350 1K680-352 ,1S007-047 1S007-048 ,1S542-002-1 A1-17030FBx2 A1-17030FRx2 A1-20028FBx2 A2-17025FBx2 A2-20025FB ,B1-17025FB B1-20020FBx2 B1-20035FBx4 1B001-121 ,1B001-481-3 1B001-482 ,1B001-483 1B001-487 ,1B001-488-4 1B001-522 ,1B001-261-2 1B208-013 ,1B260-022 1B610-020-1,1B640-023-1 1B990-004		

TECHNICAL INFORMATION

Product Name: Nikon FG-20 (FAA18001/FAA18051)

Ref. No. FG-20-840028

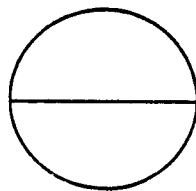
Repair manual:

Date: December 1984

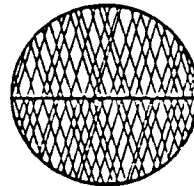
Subject: CHANGE OF FOCUSING SCREEN

RP information list: 8445

It is reported that the K type focusing screen has been changed to facilitate focusing at splitprism when mounting a lens with a small maximum aperture, such as F5.6 or F8.



Former
(1G950-002-2)



New
(1G950-039)

Concavo-convex type
splitprism

Identification (with an F5.6 lens mounted)

Former screen: Either of the splitprisms begins to darken and focusing may be difficult.

New screen: The darkness of the splitprism is reduced and focusing is possible at the prism.

For service:

The FG-20's former focusing screen or the FG's focusing screen can be replaced with new one and in such case, the exposure accuracy and infinity focus should be checked after replacement of the focusing screen.

Please note however that the replacement should be conducted on charge basis only when the replacement is strongly requested.

NIPPON KOGAKU K.K.

SERVICE DEPARTMENT
PHOTO PRODUCTS DIVISION

Fuji Bldg., 2-3, 3-chome, Marunouchi, Chiyoda-ku, Tokyo 100 Japan
Tel. (03) 214-5311. Telex: 02222950 (NIKON J) & J22601 (NIKON)